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NINETY-EIGHTH YEAR

AMERICAN Gas Journal

JANUARY 1957

Only Magazine Published Exclusively for the Gas Utility Industry

B 631116

JAN 30 1957

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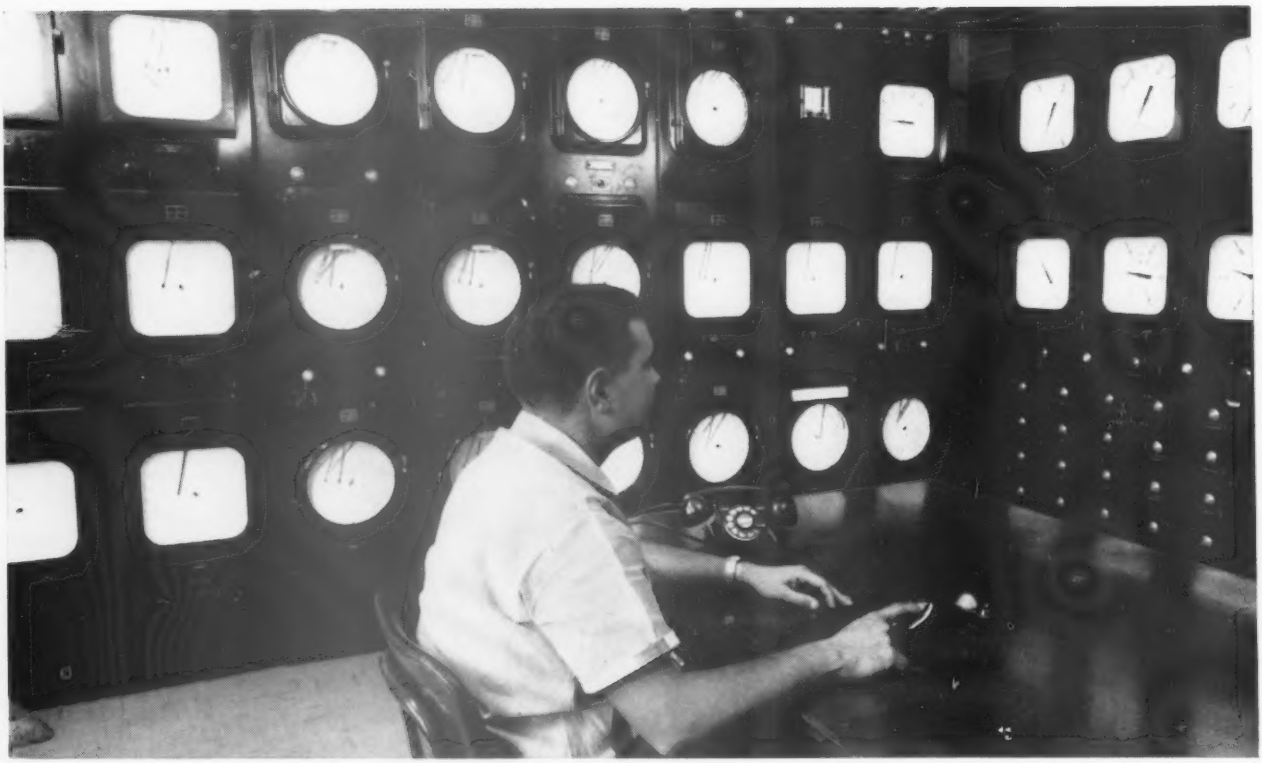

Bell System *selective calling* is used by the dispatcher of Mississippi Valley Gas Co. By flipping a switch, dialing the number of a distant metering point and reading a meter, he knows the pressure, flow and temperature at any of the company's 21 field points.

"When you're sure how much you have, you know how much you can sell"

J. H. Lambdin, Vice President—Operations, Mississippi Valley Gas Company

Bell System telemetering channels provide data on which Mississippi Valley Gas Co. can regulate flow to within 1% of a 60,000 MCF supplier contract limit. With this up-to-the-minute picture of the system, the company is better able to sell more gas.

This system, first of its kind in the country, was designed especially for Mississippi Valley. Used only to read remote meters now, it can be adapted to perform actual control functions at distant points.

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If you'd like to have faster, more efficient communications, call your Bell Telephone representative. He will be glad to study your needs.

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PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER

CHANNELS FOR: DATA TRANSMISSION • TELEMETERING • REMOTE CONTROL
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B 631116

THE CLAMP WITH GUTS!

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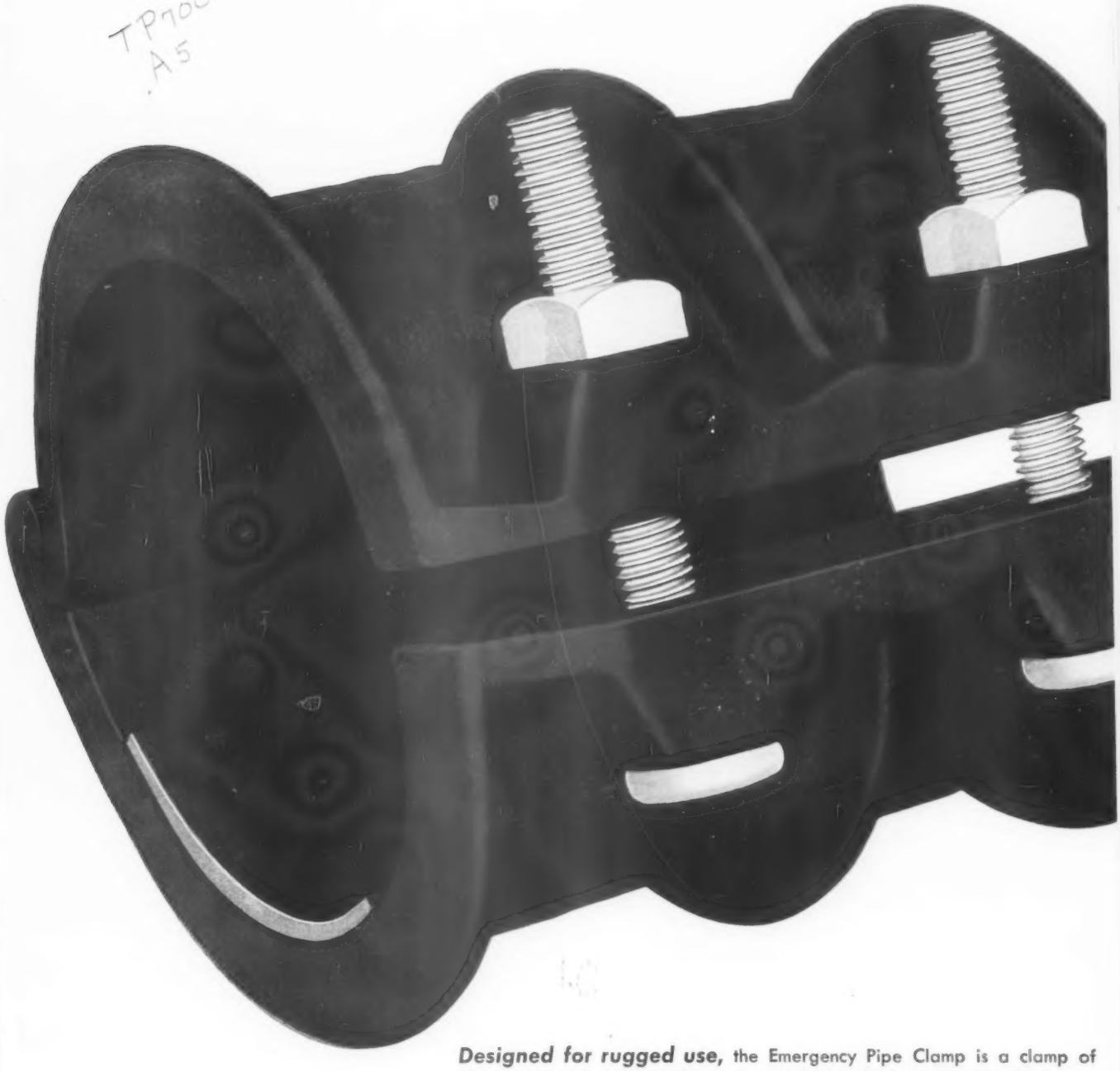

Designed for rugged use, the Emergency Pipe Clamp is a clamp of almost unlimited strength. You might say it looks fairly simple. Yet fifty years of experience have gone into its design . . . the heavy ribbing to "take" the bolt-pull, the skillful shaping of the bolt lugs for terrific strength and a free wrench swing. The full length, massive hinge which no strain can loosen! The over-thickness of metal throughout to make child's play of any pressure! The glove-like fit . . . result of shaping each clamp over an accurate mandrel, pulling it down with a 12,000 pound air vice and sledging to complete snugness.

When you put on the Emergency Pipe Clamp, it is there to stay. Tens of thousands of them are still in place after 20, 30, 40 years' service. Made in C.I. and steel pipe sizes—½" to 12" inclusive.

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the CLEVELAND 80W

—a SIDECRANE

- Lays pipe • 30,000 Ft. Lb. Capacity
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- Long Reach . . . 21 Feet • Sets Bends, Valves
- Unloads . . . Strings • Pulls Sheathing, Etc.

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Established July 1, 1859

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AMERICAN **Gas Journal**

NINETY-EIGHTH YEAR

GAS TECHNOLOGY — OPERATIONS — EQUIPMENT — MANAGEMENT — UTILIZATION

VOLUME 184 **January, 1957** NUMBER 1

CONTENTS

MANAGEMENT & OPERATIONS

Special Report on the 1957 Outlook:

Industry Leaders Optimistic on 1957: *What's Ahead? 16 top gas utility industry men comment on prospects, both locally and nationally, for the coming year* 13

Gas Utilities Look Toward 1957 With Enthusiasm and Optimism: *AGA President C. H. Zachry cites industry's anticipated growth* 20

New Markets, Home Modernization Boom Spark Bright Outlook: *GAMA President Julius Klein foresees top performance ahead* 24

How to Handle Ironcase Meters Safely 31

American Gas Fundamentals: *Glossary Or to Re* 33

Compressed Air — A Versatile Tool 38

MERCHANDISING

Live Modern, More Economically with GAS 41
Burton Larson

Merchandising News Notes: *30,000,000th Customer Added; "Tax on Cleanliness"; Brooklyn Union Hits $1 Million Mark for Second Time; Mrs. America Returns from Russia; New Natural Gas Display Opened in Washington Housing Center* 40

FEATURES

MCF	4	Gas Utility Industry Personals	45
American Gas Fundamentals	33	Gas Utility Trade Personals	46
Gas Utility Industry Calendar	37	New Literature	47
Merchandising News	40	Gas Utility Trade News	48
Gas Utility Industry News	43	New Equipment	50

Advertisers' Index 52

Editorial Index Available

The Index to Volume 183 (January-December, 1956, inclusive) of American Gas Journal is now available. Subscribers desiring a copy of this index may obtain one by writing on their company letterhead to Circulation Director, American Gas Journal, P. O. Box 1589, Dallas 21, Texas.

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Directors of the Peoples Gas Light and Coke Company, Chicago, have authorized a program for submitting to stockholders a proposal to split the company's capital stock on a 4 to 1 basis. Par value of the stock would be changed from $100 to $25. Stockholders will vote on the proposal at the next annual company meeting on April 4, 1957.

Pacific Gas & Electric plans an early start on a 200-mile pipeline from the Sacramento Valley to the Eureka area in far northern California. The 12-in. line would cross a rugged mountain range, presenting numerous engineering construction problems. With a capacity of 21,000,000 cu ft per day, the line will be in operation in early 1958. Eureka's present supply of gas — the Tompkins Hill field south of that city — is diminishing and demands are increasing in the area.

November shipments of gas ranges, water heaters, and central heating units were below corresponding 1955 figures, according to a GAMA telegraphic survey report. Overall, for the first 11 months, shipments of automatic gas water heaters and gas-fired boilers were ahead of 1955, while gas ranges were down as were gas-fired furnaces. A substantially lower rate of housing starts in 1955 accounted for much of the reduced production.

Large industrial customers in California, whose interruptible gas service rates are adjusted to the price of fuel oil, may pay more for gas in the future. Fuel oil prices continue to increase, and PG&E has filed application with the California PUC to increase rates. Currently, rates are adjusted automatically, but only to a limit of $2 per bbl of fuel oil in tank car lots at refineries. Oil is now posted at $2.60. The $2 ceiling on the automatic rate adjustment is unrealistic, says PG&E, which wants the ceiling removed. The company also pointed out that it is paying more for natural gas and now has a depressed rate of return on its gas operations.

Kenneth L. Smith has been named assistant chief of the FPC's Bureau of Rates and Gas Certificates, succeeding Edward M. Imhoff, who resigned in December. He first joined the FPC in 1938 as principal examiner of accounts. He is a native of Illinois, graduate of the University of Illinois holding BS and MS degrees in accounting, and is a certified public accountant.

A $51,000,000 expansion program over the next five years has been announced by Oklahoma Natural Gas Company. Major portion of the program will be spent to connect new customers to the distribution system and to improve service. The company now has nearly 350,000 customers served by more than 7000 miles of line.

Industry in the Pittsburgh area is constantly calling for an increased natural gas supply, says the Pennsylvania Natural Gas Men's Association. The association's index of natural gas consumption (1947-49 = 100) topped 200 for the first time in October, reaching 201.3 with seasonal effects eliminated.

American Natural Gas Company says that its plans to continue expansion of its pipeline system capacity and market deliveries will not be altered by recent action of Gulf Refining Company seeking to cancel contracts for additional gas reserves.

Increased rates for natural gas service in three Wyoming communities — Sheridan, Buffalo, and Kaycee — has been denied Montana-Dakota Utilities Company by the Wyoming PSC. The commission said the utility is earning 6.36 percent on its investment in Sheridan. The city of Sheridan claimed at a hearing that the firm's reserve for depreciation was too small and that it was charging off appliance selling operations to the utility division of its business.

Natural Gas Pipe Line Company of America has been authorized by the FPC to build a 350-mile line in North Texas and southern Oklahoma, at a cost of $32,100,000, to deliver 240,000,000 cu ft daily for ultimate delivery to Natural's customers in the Chicago area. Lone Star Gas Company was authorized to sell NGPL up to 100,000,000 cu ft per day in Stephens County, Oklahoma, where the new line meets the Lone Star system. A competing application for a 230-mile line to allow Lone Star to deliver gas to Natural at Natural's main line station at Fritch, in the Panhandle, was refused.

For the sixth time, the Canadian Board of Transport Commissioners has extended the deadline for Trans-Canada Pipe Lines, Ltd., to show that it can arrange financing for the 2340-mile, $370,000,000 pipeline, the world's longest. A poor money market has been the chief delay, company officials declare. Some 218 miles of the line have already been completed.

United Gas Corporation's gas reserve picture is good, says its president, N. C. McGowen. At the beginning of the year, the company owned or had under contract some 32.5 trillion cu ft, approximately 12 per cent of the total reserves in the U. S., he told the New York Society of Security Analysts. In the first six months of 1956, the company added 1.2 trillion cu ft in reserves, owned or contracted, equal to 1955 withdrawals of 1.2 trillion. United Gas also is going for a new type of industrial contract, on a cost plus basis, which assures the company of a fixed spread over and above cost of purchased gas. New industrial contracts are being signed on this basis and existing contracts are being renegotiated where possible.

The FPC has approved the first step in Columbia Gas System's proposed realignment. A new subsidiary, Kentucky Gas Transmission, will acquire all interstate transmission facilities of Central Kentucky Natural Gas Company, buy its gas at wholesale from United Fuel Gas Company, and sell gas to Central Kentucky and several non-affiliated companies. Meanwhile, Manufacturers Light and Heat Company and Ohio Fuel Gas Company will acquire all the facilities of Natural Gas Company of West Virginia. Eventually, Columbia will have intrastate distribution companies and interstate transmission companies, reducing the amount of criss-cross federal and state regulation.

Vermont will soon have natural gas service and with it, a regulatory safety code. The state PSC and Vermont Gas Corporation have reached a compromise agreement on new gas lines, whereby no construction will be started until safety regulations have been adopted.

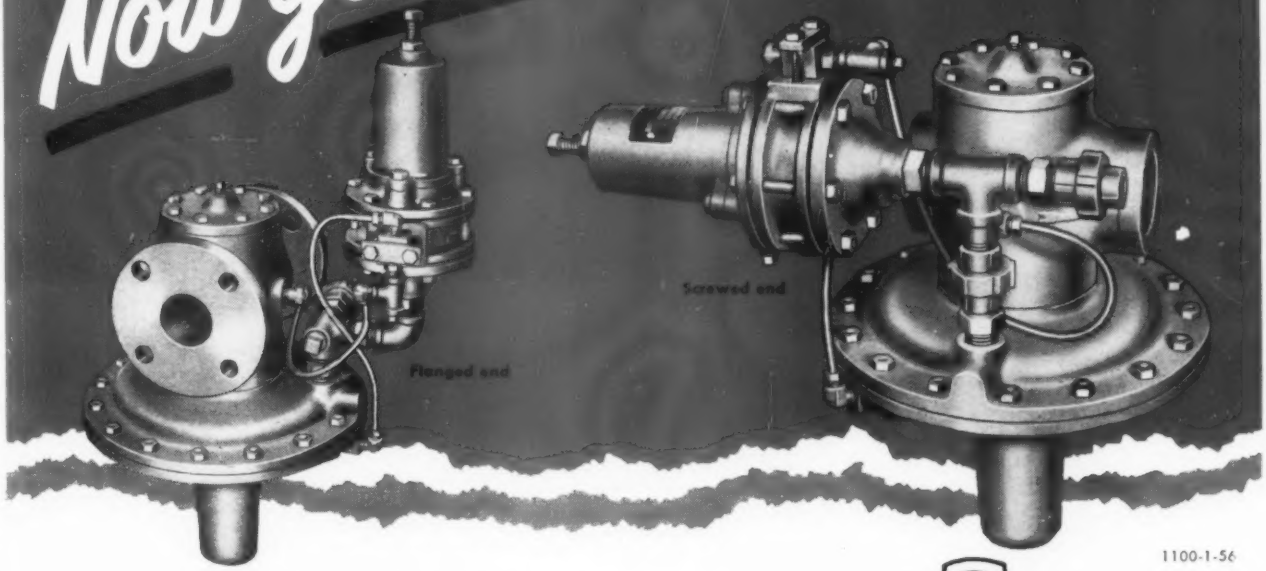
LINE PRESSURE GOING UP!

MEMO
FROM THE OFFICE OF THE PRESIDENT

Geo:—
Considering raising
line pressure
Better check this—
Now good up to
400 psi
Rehm.

Chaplin-Fulton '1100' REGULATOR

Now good up to 400 psi



1100-1-56

Now, more versatile than ever—good up to 400 psi. Your choice of three body assemblies—

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All suitable for outlet pressure range from ounces to 150 psi with no change required in regulator or pilot—just change the pilot spring. It's accurate—versatile—compact! A good buy!

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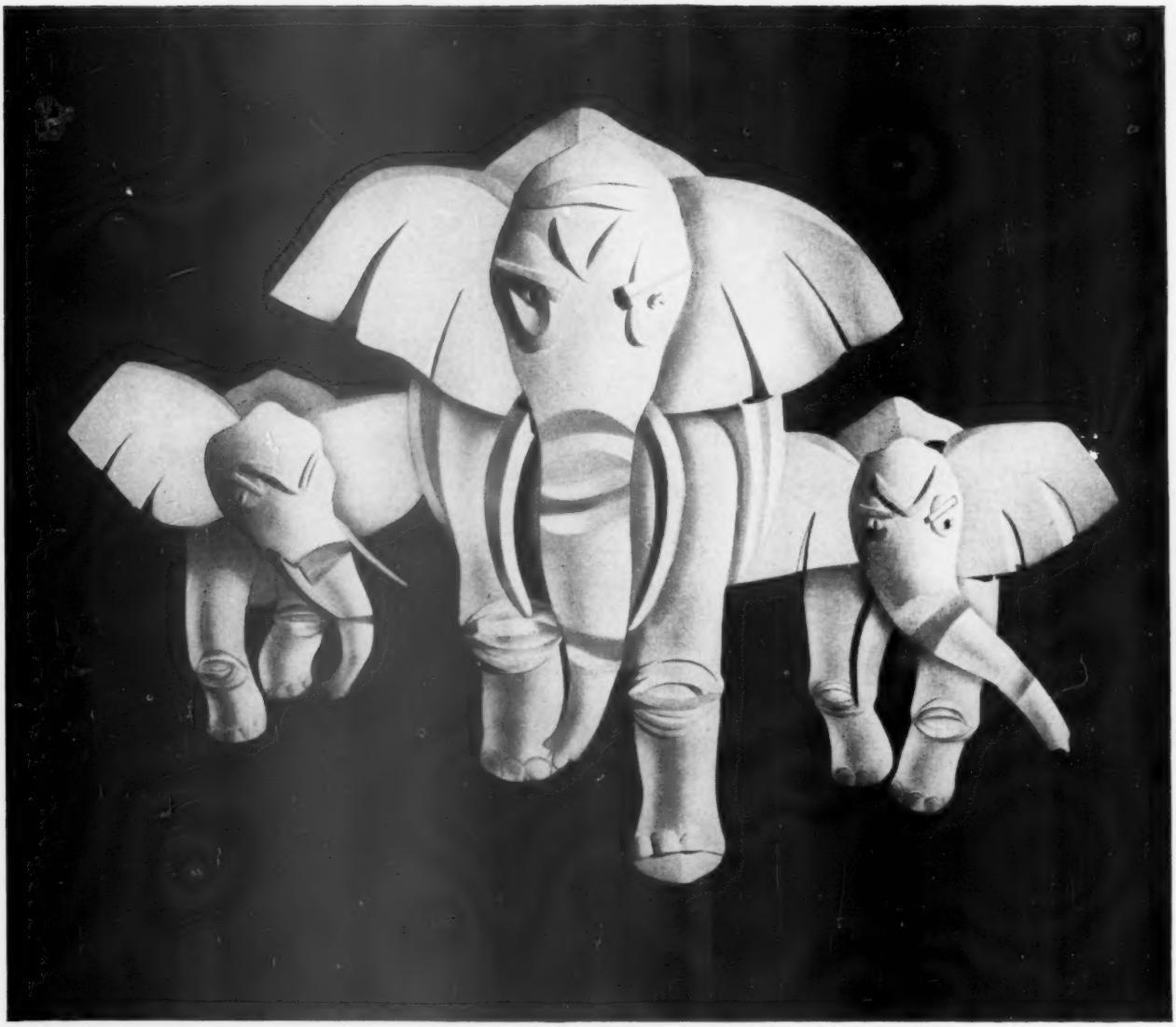

White Elephants That Stalk Utility Offices

These white elephants are made of paper! They're that mass of ever accumulating records that bulk up files, eat up space and gobble up big hunks of profit! Are you feeding them in your office? Most utilities are!

If you have any doubt about these beasts being in your office – try these three simple tests:

Test #1 – Do you have an organized policy covering systematic retention, transfer or destruction of all papers and documents? If not, you must be feeding a white elephant! Tremendous savings are possible. Assuming you have 50 files, annual savings of $3850* will result from the 35% of the records to be destroyed . . . 100 files double this amount, and so on. And savings from "destruction" are only a drop in the bucket!

Test #2 – How long does it take to find or file a paper in your organization? It should not take longer than 1 minute. If it does, your company probably needs a Records Analysis.

Test #3 – When you ask for a file by *subject* instead of by name do you get all the records pertaining to that subject – and are they in order for best use? A subject file is the backbone of a record-keeping operation – the source of vital facts for management decisions.

Why not get the latest information on actual dollar savings possible through records management methods. Many utility companies are already utilizing this service. Send for X1200A–"A Basic Plan For Records Retention."

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***Ask for BSD32—"Get These Annual Dollar Savings From Your Files."**

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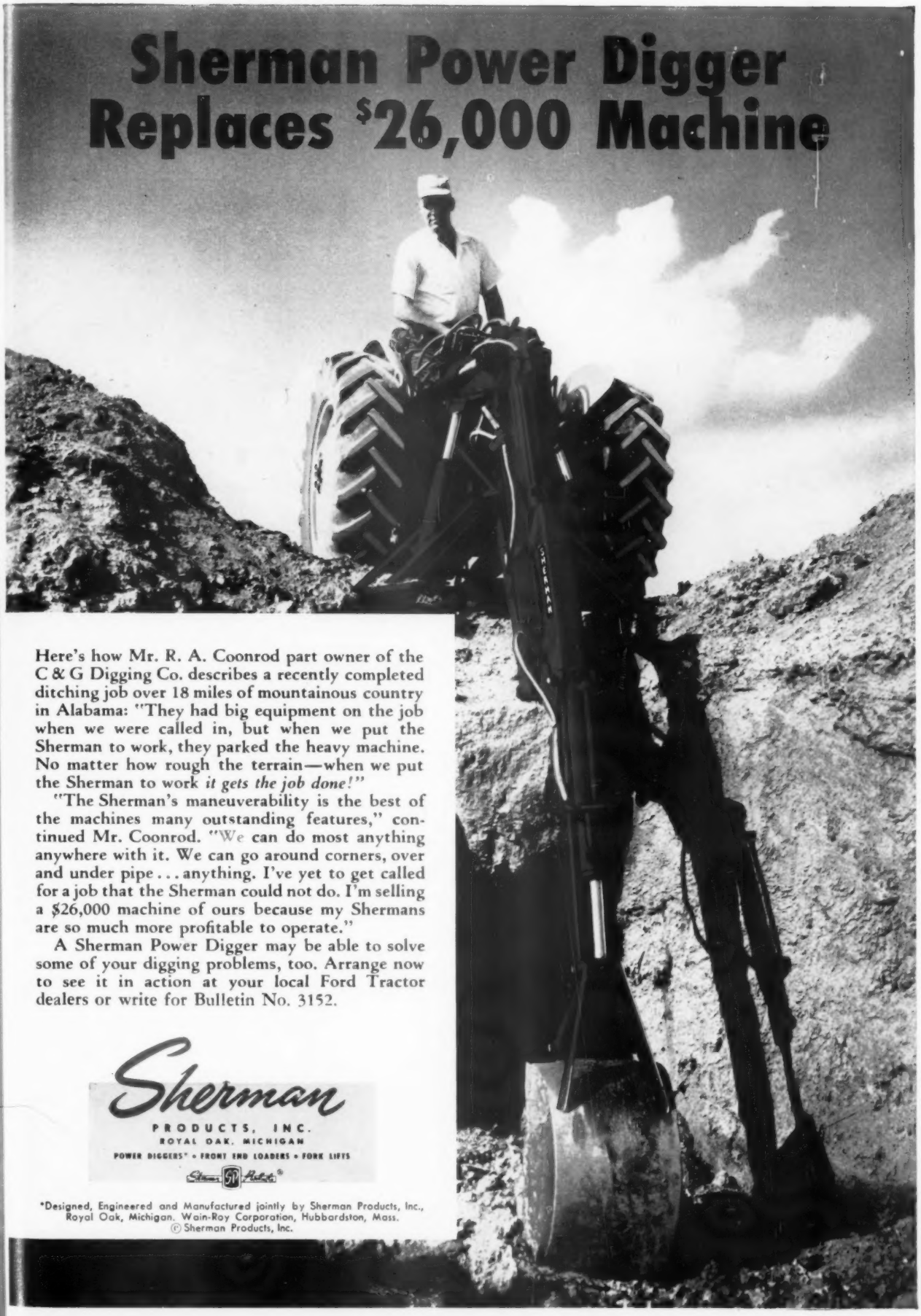
DIVISION OF SPERRY RAND CORPORATION

Sherman Power Digger Replaces $26,000 Machine



Here's how Mr. R. A. Coonrod part owner of the C & G Digging Co. describes a recently completed ditching job over 18 miles of mountainous country in Alabama: "They had big equipment on the job when we were called in, but when we put the Sherman to work, they parked the heavy machine. No matter how rough the terrain—when we put the Sherman to work *it gets the job done!*"

"The Sherman's maneuverability is the best of the machines many outstanding features," continued Mr. Coonrod. "We can do most anything anywhere with it. We can go around corners, over and under pipe . . . anything. I've yet to get called for a job that the Sherman could not do. I'm selling a $26,000 machine of ours because my Shermans are so much more profitable to operate."

A Sherman Power Digger may be able to solve some of your digging problems, too. Arrange now to see it in action at your local Ford Tractor dealers or write for Bulletin No. 3152.

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ROYAL OAK, MICHIGAN
POWER DIGGERS* • FRONT END LOADERS • FORK LIFTS

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Delta Air Lines Gives $225,000 Bonus in U. S. Savings Bonds

C. E. WOOLMAN
President and General Manager
DELTA AIR LINES

Delta Air Lines, Inc.

GENERAL OFFICES · ATLANTA AIRPORT · ATLANTA, GEORGIA

TO: All Members of Delta Family

FROM: President and General Manager

This has been a difficult but successful year. Each of us has had a hand in our accomplishments.

Again we want to share our good fortune with all our people and it is a pleasure to announce that all personnel with more than six months of service as of May 24, 1956, will receive a $50.00 U.S. Savings Bond. All personnel with six months of service or less as of that date will receive a $25.00 U.S. Savings Bond. The total value of these bonds will be about $225,000.00.

The bond is both a share in our achievements and an added expression of appreciation for your contribution to them.

C.E. Woolman

Delta

If you are wondering whether *your* employees would prefer Savings Bonds to Cash . . . take a quick glance at these figures:

. . . 8,000,000 Americans enrolled in the Payroll Savings Plans of *40,000* companies invest $168 Million *per month* in U. S. Savings Bonds.

. . . 40,000,000 Americans hold $41 Billion (cash value) in Series E and Series H Savings Bonds . . . a huge reservoir of future purchasing power.

. . . 67% of *all* Series E Bonds that matured up to June, 1956—more than $21 Billion—are being held by their owners under the automatic extension program.

Join Delta Airlines—and many other fine companies—give your Bonus in Bonds—the gift that grows. Savings Bond Division, U.S. Treasury Department, Washington 25, D. C.

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The American Gas Journal

PUBLIC SERVICE ADVERTISING COUNCIL

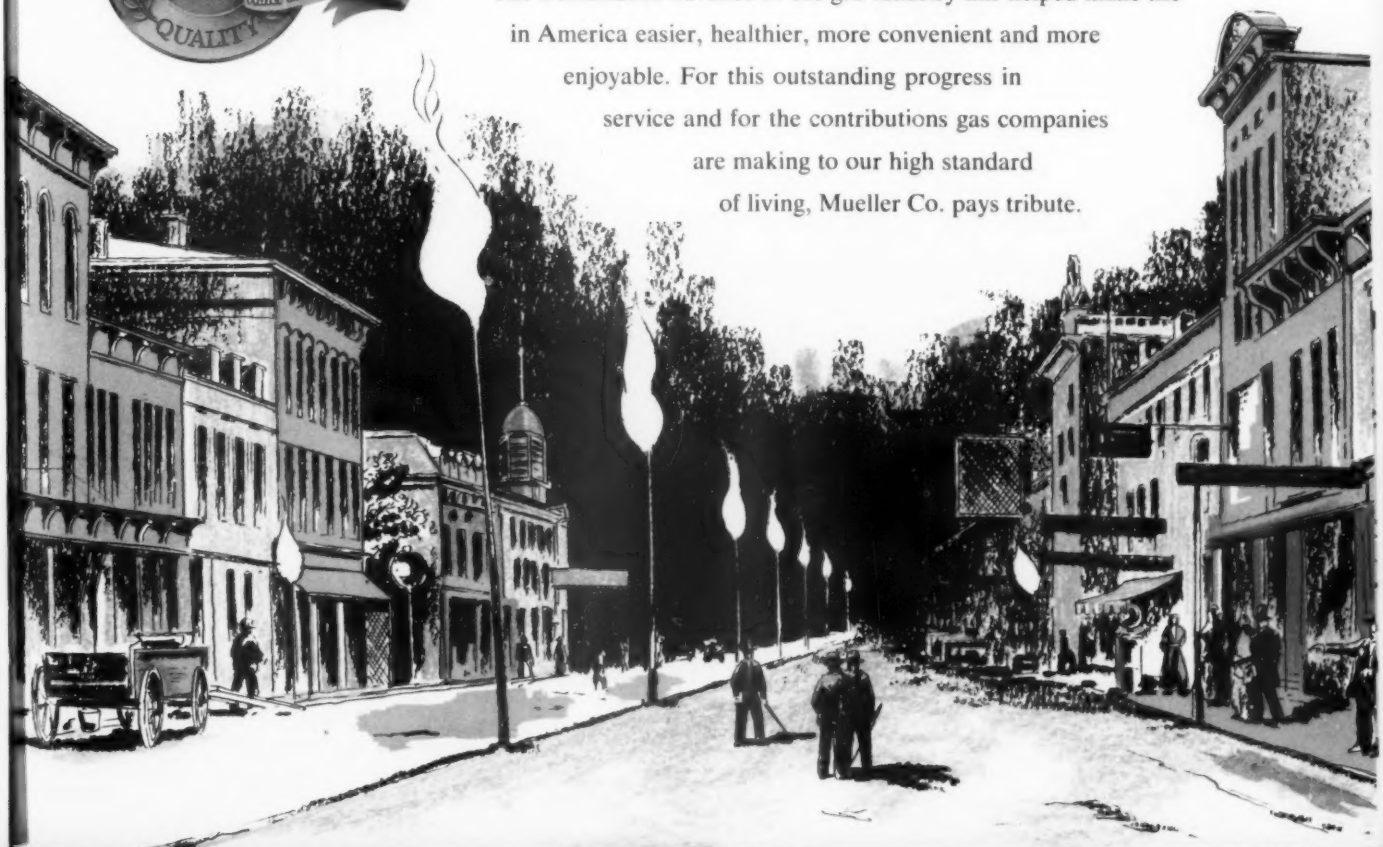
from a dream to a reality

66 billion therms of gas each year

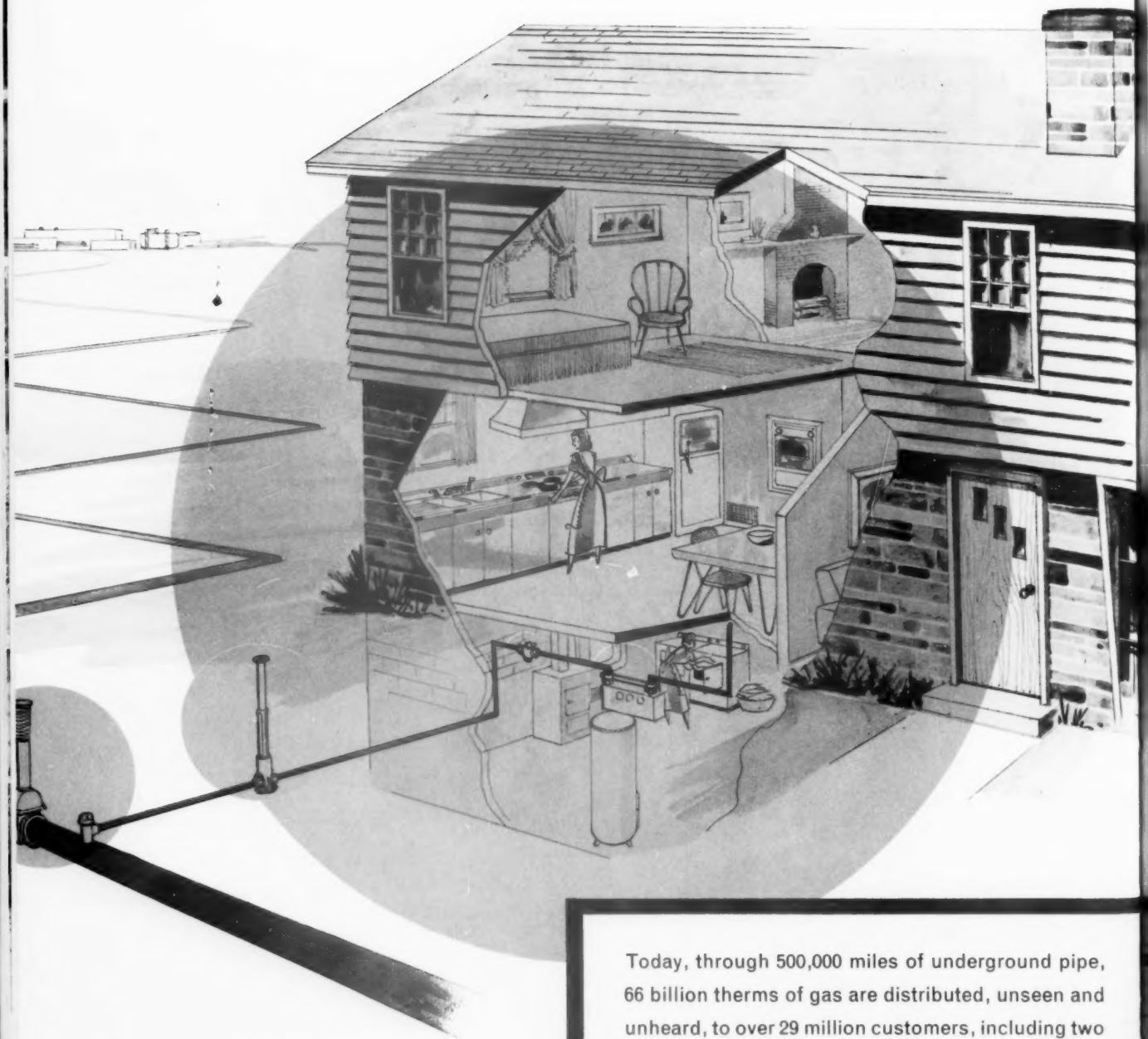
One hundred years ago, only 92 families were fortunate enough to have gas stoves on which to prepare meals. The use of gas in home and industry was only a dream of the future. Today, that dream is a reality as 29 million customers utilize 66 billion therms of gas each year.

MUELLER CO. 100th YEAR SERVING the Water and Gas Industries QUALITY

The tremendous advance of the gas industry has helped make life in America easier, healthier, more convenient and more enjoyable. For this outstanding progress in service and for the contributions gas companies are making to our high standard of living, Mueller Co. pays tribute.



Serving 29,000,000 A



Today, through 500,000 miles of underground pipe, 66 billion therms of gas are distributed, unseen and unheard, to over 29 million customers, including two million industries. Gas companies add services for 4,000 new customers each day.

MUELLER CO. 100 YEAR SERVING the Water and Gas Industries QUALITY

American Homes and Industries

The gas industry was founded by William Murdock, a British engineer and inventor, who lighted his cottage with manufactured gas in 1792. By 1803, he had progressed enough to utilize manufactured gas to light an entire factory.

Following Murdock's success, lighting with manufactured gas was adopted in America in 1816, when gas lights were used in Rembrandt Peale's museum in Baltimore. This proved so successful that the city contracted with Peale for the manufacture of gas to light city streets.

Use of natural gas in America was introduced at Fredonia, New York in 1821 and the first natural gas company was organized in that city in 1858. Yet, a year later, there were less than a hundred families in the entire nation preparing meals on gas stoves.

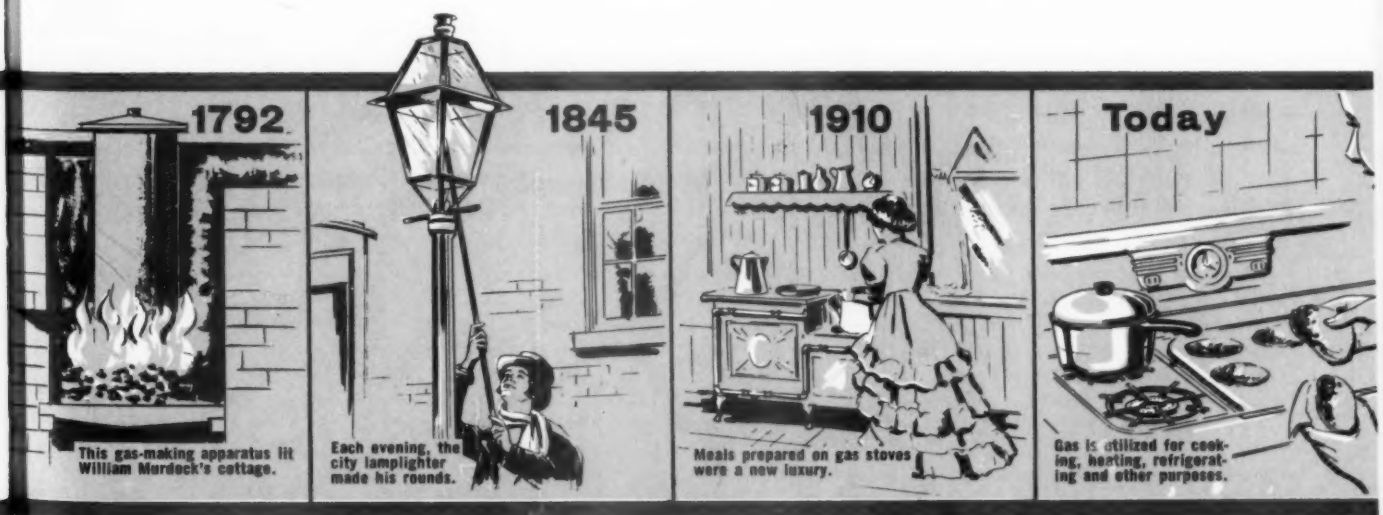
Nor was acceptance of gas lighting rapid, as it was a radical change from popular lighting methods. It was not until the decade from 1865 to 1875 that the use of gas for lighting and cooking began to make significant progress.

By 1920, gas usage had been firmly established. Then, the technique of welding together lengths of steel pipe, capable of transmission of gas under pressure, was perfected, permitting bulk transport of gas. Today one-half million miles of steel pipe, more than twice the nation's railroad mileage, carry gas, underground, to customers in every part of the United States.

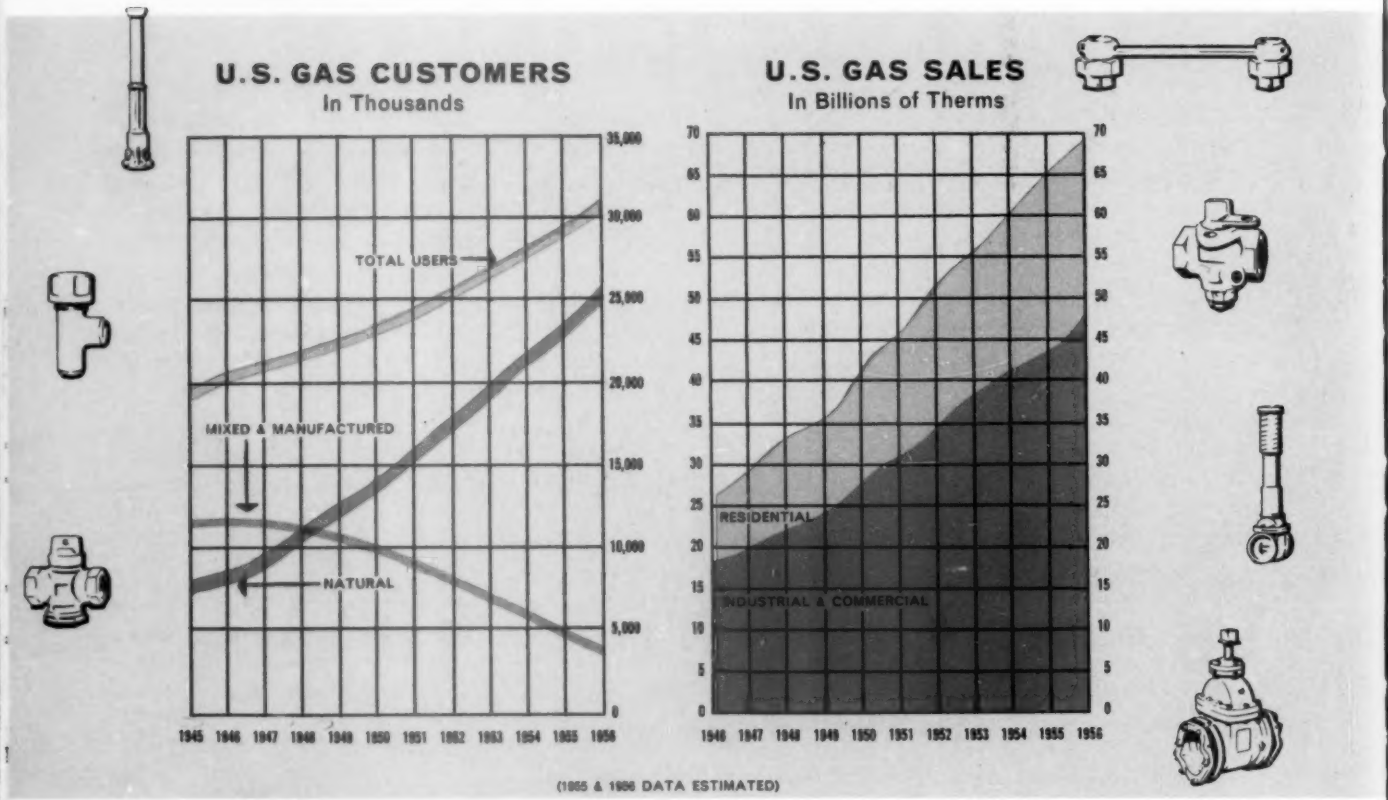
In 1950, Mueller Co. introduced the No-Blo equipment line providing the industry with a fast, safe method of installing new services and repairing or revising existing systems. Mains can now be drilled, tapped and service fittings installed without interrupting service to other customers and in complete safety, without loss of gas. The development of No-Blo greatly facilitated installation of new services by gas companies everywhere.

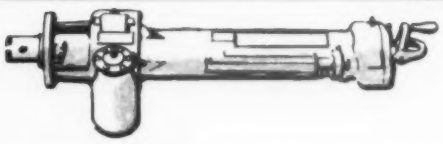
For each of the 4,000 new customers added to their services each day, gas companies must install a service line, meter and necessary fittings, with additional fittings required for industrial customers. And, to insure adequate service for rapidly multiplying suburban areas and for other growing areas, gas companies must also install thousands of miles of new mains and laterals with service fittings. As gas service is increased, existing systems will require larger mains and additional facilities to provide increased volumes and necessary pressures.

In 1956, revision of existing gas services and installation of additional services reached a record cost of $399,315,000, as total construction expenditures topped 1.3 billion dollars. An additional outlay of 187 million dollars each year is allocated for maintenance and repair.


1792
This gas-making apparatus lit William Murdock's cottage.
1845
Each evening, the city lamplighter made his rounds.
1910
Meals prepared on gas stoves were a new luxury.
Today
Gas is utilized for cooking, heating, refrigerating and other purposes.

What's ahead for Gas?





Over one million new customers each year make the future bright for the gas industry.

Use of natural gas could triple by 1975, according to government reports. Industry, with a 154 per cent increase in gas usage since 1946, will probably utilize much more gas in the future, as fuel, tool or ingredient.

By 1957, domestic usage is expected to increase as much as 147 per cent over 1946, with new installations of water heaters, furnaces and other equipment.

The gas industry presently has reserve resources of about 217 trillion cubic feet of gas, enough for about 23 years of consumption at the expected rate of eight trillion cubic feet next year.

But, the rapidly growing market, and the anticipated increase in usage, places a more probable estimate of the present gas reserve as being adequate for 10 to 15 years. Reserves are replenished regularly as new wells are brought in.

The development and expansion that gas companies have already undergone to meet the rapidly growing market clearly demonstrates their ability to handle any needs or problems of the future.

MUELLER CO. **DECATUR, ILL.**

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MUELLER CO. 100th YEAR SERVING the Water and Gas Industries QUALITY

Since 1857

OUTLOOK FOR 1957

What lies ahead for the gas utility industry? In reply, 16 leading men of the gas utility industry present their views on both specific and general business issues and how they will affect sales, service, and expansion in the next 12 months

Industry Leaders Optimistic on 1957

New Team Spirit Will Make 1957 a Record Sales Year . . .

A. W. Conover,
President
Equitable Gas Company

It's very pleasing for me to reflect upon the future of the gas utility industry; pleasing because it is an industry that is still bursting through ever-receding growth horizons. It is a dynamic industry endowed with fine leadership, leadership that since the end of World War II has increased the industry's worth to $16 billion, the sixth largest in the country. It is proof again that initiative and determination by private enterprise can lead to resounding success.

Naturally, there are both credits and debits in our balance sheet of the future. Basic, of course, are the proved recoverable natural gas reserves in the United States, which in 1956 totaled 223.7 trillion cu ft, an increase of 12 trillion over reserves of 1955.

There have been exciting innovations such as thermostatic top-burner temperature control on our modern automatic ranges. Progressive engineering research during 1956 has produced a gas-fired incinerator for home use, which I feel will meet the most rigid stipulations of city ordinances which have heretofore hampered sales in certain areas. A result of this will be increased sales of gas in 1957 and for many years to come.

Another excellent adjunct to the present base load, so important to all utilities, will be gas air conditioning. Many new homes are now being equipped with year-round gas air conditioning; whereas electric air conditioners have practically had the field to themselves in the past. A number of manufacturers are presently field-testing gas units and spending a considerable amount of money in research. Many of the new models will be ready for the market late in 1957, which will give added stimulus to the sale of gas in this lucrative field.

Possibilities of expansion in the industry remain great. For example, our own Equitable Gas Company plans to begin operations in its new hydrocarbon plant in Maytown, Kentucky, in March. Here is a phase of the gas industry that will help assure it a dynamic place in America's future, for from natural gas come synthetics such as the plastics and dyes so necessary to modern everyday living.

We have become conscious also of a great need in our industry for a public relations program that emphasizes service in the community. We are educating our employees and our public to help them become better citizens. A realization has come that we must build good will in all markets and prove to people a truth that is often obscured behind a veil of political mud-slinging: That it is our free enterprise system that has built the free world into the land of plenty. It is an asset worth guarding zealously.

A new team spirit in all phases of the industry from the wellhead to the appliance in the customer's home will help make 1957 one of the best years on record. I think the next five years will see us attain new heights in sales, customers, and growth with producer, pipeliner, and distributor — each playing his part on a great gas industry team.

Business to Double in Five Years As Supplies, Markets Increase . . .

Chas. M. Sturkey,
President
Washington Natural Gas Company

Washington Natural Gas Company is opening the door to a brand new business here in the Pacific Northwest with the conversion to natural gas, which we completed on December 31. The people of the Pacific Northwest are accepting and buying natural gas. We have demonstrated that time and again by competing with the other fuels available and securing 95 per cent of the available new business in new residential developments. Industry is accepting natural gas and that is proven by the fact that we have sold all available interruptible gas even before the gas arrived here. We still have a tremendous program for the year, 1957, and the immediate years to follow. We expect within the period of five years to double the business of the Washington Natural Gas Company in the 29 towns and cities which we serve here in the Pacific Northwest.

OUTLOOK FOR 1957

Gas Industry Can Face Future with Confidence . . .

J. Theodore Wolfe,
Executive Vice President
Baltimore Gas and Electric Company

'Way back in 1816, a portrait painter and exhibitionist named Rembrandt Peale persuaded the mayor and city council of Baltimore to let him light the streets with gas. Thus was the gas utility industry of America born.

Today, gas street lights are virtually a thing of the past; but the industry which had its humble beginning 140 years ago is now the sixth greatest in the nation. Far from suffering the infirmities of age, it is an industry of youthful vigor, enjoying a remarkable growth. Here in Baltimore, where the industry was born, that growth is currently at the rate of 15 percent a year, in sales, with no sign of a let-up.

Certainly, the gas utility industry can face the future with confidence. Research and aggressive promotion have broadened its markets and should continue to do so. 1957 may well prove to be the year when gas begins to have a real impact on the tremendous market for residential cooling equipment. The time, talent, and money devoted by the gas utility industry and several appliance manufacturers to the development and sale of competitive year-round air conditioning devices should pay big dividends through the improvement of system load factors. This is perhaps the industry's greatest challenge, and its greatest opportunity.

Industry Leaders See Need For Hard-Hitting Promotion . . .

Earl H. Eacker,
President
Boston Gas Company

In Boston Gas Company, we anticipate the continuation of a healthy growth in the sales of gas appliances and accordingly in the sale of gas itself. This requires thorough sales promotional programs, hard-hitting advertising, and comprehensive employee training in both sales and service work.

Here in New England we do not have what might be called "runaway" demands for gas because our product is sold primarily on its merits rather than on a considerable differential between the price of gas and other competitive fuels.

The industry's television program will be a reality in 1957. It appears from the support given this program that more and more of the industry's leaders recognize the need for hard-hitting sales promotion. This is good, and I believe that this attitude will become more pronounced as time goes on.

It is imperative that all gas utilities and manufacturers of gas ranges get behind the very excellent promotion of AGA of fully automatic gas ranges. The time has long since past when this industry should permit its approval of the sale of any but a fully automatic gas range. In this connection I believe that the manufacturers in developing their lines should make more use of the research studies which have been made through PAR. We certainly can make improvements in our burners and burner controls.

We need further developments in gas air conditioning. Although the new research program on air conditioning and the work which is being done by some manufacturers is most heartening, greater support should be forthcoming. Progress to date in the air conditioning field has been slow.

I believe we need constantly to strive to improve equipment in all respects and to do this we need young enthusiastic trained engineers with imagination. Everyone knows that trained engineers are scarce, but I believe it is possible for our industry to recruit members from our graduating classes who are required in our industry if we go about it realistically, early, and are willing to meet competitive conditions. There are a great many opportunities for young people in our industry.

Rapid Expansion Reflects Gas Industry's Economic Strength

Guy W. Wadsworth, Jr.,
President and General Manager
Southern Counties Gas Company of California

The preliminary 1957 budget of Southern Counties Gas Company of California (a wholly owned subsidiary of Pacific Lighting Corporation) is a sharp reflection of continued growth of Southern California and the still rising economic strength of the natural gas industry.

Southern Counties in 1957 expects to have a budget of around $24,000,000 and add approximately 54,000 new customers to its lines, which extend from Paso Robles in the north, to San Clemente in the south; and from the Pacific Ocean's shores in the west, to the California-Arizona border, in the east.

The planned budget will be the highest in the company's 45-year history, substantially exceeding the previous high of $19,645,000 of 1956.

In the 11 years — 1946 to 1956 — this company's rate of growth has been at better than 134 per cent. By year-end 1956 we expect to be serving more than 597,000 customers, compared to the 254,770 consumers on our lines in 1946. This surely makes Southern Counties one of the fastest growing gas utilities in the country.

The continued high rate of customer additions (in excess of 50,000 a year since 1955), plus the increased use of gas by all our consumers (our average residential customer now uses twice as much gas as he did in 1940) reflect the vastly increased amounts of gas we now import from out-of-state sources.

In 1947 when the "Biggest Inch," 1200-mile pipe line from

New Mexico and Texas sources to Southern California was first made operative, this company and its affiliate, Southern California Gas Company, were importing 175,000,000 cu ft of gas a day. By July, 1958, the two companies expect to be purchasing an average of 1,016,600,000 cu ft of gas a day from El Paso Natural Gas Company.

The original 30-in. California segment of the "Biggest Inch" has been completely looped and the two California utilities are now in the process of building a new 30-in. transmission line from the California-Arizona border to Los Angeles. Cost of this new line — from Needles to Alhambra — is expected to run $32,614,000, including compressor facilities. Southern Counties' share of this total will be approximately $9,785,000.

In addition we plan to add more than 12,000,000 ft of pipe of various sizes to our distribution system, with only about 300,000 ft of this scheduled for replacement.

St. Louis, Laclede Experience Dynamic Growth, Moving Ahead

Robert W. Otto,
Chairman of the Board
Laclede Gas Company

Laclede has been in business many years, and I may safely say that the year just closing has been the greatest business year in our history. In the progress of the year's operations, the company sold more gas to more customers, spent more for expansion, paid higher wages to more employees, earned more per share, and paid more dividends to stockholders than at any other time.

Some idea of Laclede's enormous growth, since the war, may be had by comparing figures on revenue and property. Since 1949, net plant additions of $48,600,000 have been made, nearly doubling the investment in property and plant. Operating revenues for the fiscal year ending in September were $44,600,000 — 2.8 times the revenues of 1949 and $4,500,000 greater than in 1955.

During our last fiscal year, the company spent $10,600,000 for new construction, a record sum. During 1957, the amount will be nearly $1,000,000 more.

Included in the 1956 construction figure was $1,900,000 for the development of underground storage at the company's storage site at Florissant, Missouri. The project, begun last year, already has allowed Laclede to relax somewhat its restrictions on taking on new house heating customers. During the year, the company approved nearly 15,000 requests for house heating, including both conversion to gas heat and virtually all new homes built in our service area over the period. Through the continuing expansion of underground storage, the company anticipates keeping pace with new home construction in its service area and satisfying within the next few years the tremendous demand for conversion to gas heat.

Construction of new mains, services, meters, and system reinforcements to provide for load growth required an investment of $6,900,000 during the past year. The remainder, $1,800,000, went for general construction expenditures, including a new headquarters building for the northwest district of the company service area. This section of St. Louis County is one in which a great many suburban subdivisions have been built since the war. The new headquarters, Laclede's third operating center, is giving faster service to customers through decentralization of operations.

During the last fiscal year, company earnings were $1.21 per share of common stock, an increase of 24 cents over earnings in 1955. At the same time, the number of employees on Laclede's payroll rose to 2600 — highest in our history — from a previous high of 2466. It is notable that 15 per cent of the company's payroll has been with Laclede 25 years or longer, a significant proportion.

Another significant event this year was the election of H. R. Derrick as our new president. Mr. Derrick's excellent record as president of Alabama Gas Corporation is well known in the industry, and we know he will make a substantial contribution to Laclede.

St. Louis has undergone a dynamic change in the postwar era. Under zealous, effective leadership, this metropolitan area has shaken off complacency and launched an ambitious program of civic betterment. Laclede is fortunate to be a part of this program, which has received our active support from its inception. We expect St. Louis to move ahead with confidence in the future, and we at Laclede expect to move with the community.

Gas Utility Industry Will Continue to Prosper . . .

W. G. Rogers,
President
The East Ohio Gas Company

The last decade has witnessed enormous advancements in the natural gas industry. We at East Ohio are confident that this progress not only will continue, but will increase in its intensity.

Looking back, I can remember the time when a customer of ours who used gas for house heating was categorized in the well-to-do class. Today, of our more than 730,000 residential and commercial customers, more than 84 per cent use gas to heat their homes. We confidently expect that by the end of this year (1957) we will have 87 per cent using gas for house heating and 92 per cent by 1962.

Similarly, we expect more customers. During 1956 we added four new communities to bring our system total to 125. Several other new communities will be added early this year with the very excellent possibility that East Ohio will extend service to still others later in the year.

During 1956, we added approximately 25,000 customers. We expect that the figure for this year will be 20,000. By 1962 we anticipate that we will be serving 830,000 customers in northeastern Ohio.

Naturally, with additional customers, we expect increased sales of gas appliances in our territory. We are rather proud of the fact that, at this time, 12 per cent of our customers have gas incinerators in their homes. That figure is expected

to increase to a possible 15 per cent by the end of this year and to 23 per cent by 1962.

Likewise, we feel that gas air conditioning, the newest application of natural gas in the home, will begin to gain a solid foothold in northeastern Ohio homes and within five years will find itself well entrenched.

Our surveys indicate that the sudden surge of electric ranges a few years ago has been halted and that the efficiency, dependability, and economy of gas for cooking will continue to insure our leadership in that field. At the present time, almost 83 per cent of the ranges in East Ohio territory use gas.

Incidentally, the "burner with the brain," the thermostatically-controlled top burner, has been very well received in northeastern Ohio. Our expectations for it for this coming year are very high.

Basically, the reason for our optimism for the sales of all gas appliances is simply that they can be operated more economically and with greater assurance of dependability.

Without reservation, I feel that the natural gas industry will continue to prosper; that it will attain peaks in the next five years that were not even considered possibilities 15 years ago.

Growth of Southwest Spurs Lone Star's Expansion . . .

D. A. Hulcy,
President
Lone Star Gas Company

The Southwest, and particularly the area in which Lone Star Gas Company operates, has seen great development in the past decade. New industries are continually locating in this part of the country, and we anticipate this growth will continue for the next several years. In order to meet the additional requirements of new customers, our pipe line capacity and distribution lines will be materially increased. We expect to add considerable capacity in new gathering lines to connect new fields and additional wells in fields already in the process of development.

For the past several years we have added between 30,000 and 35,000 customers each year, and during 1957 we expect this trend to be repeated. The use of liquefied petroleum gas is also expanding in our rural areas.

The competitive spirit of the gas industry will not only continue as it has in the past, but it will be accelerated to a great degree. The industry has a most progressive program in research and development—from the well to the consumer — and as new ideas and methods are found they will be used in all segments of the industry. Selling the industry to the public has been one of the big jobs in the past, and in 1957 our service to customers and communities will continue this selling job.

The industry has become most attractive to engineers and professional people, and the graduate, in choosing his profession, will find the gas industry one of the most interesting fields of work.

Statesmanship, Service, Sales, Personnel Problems Will Be Solved . . .

Marvin Chandler,
President
Northern Illinois Gas Company

While I recognize that the gas industry has many unsolved problems to face in 1957, the outlook for 1957 can't be anything but optimistic. All indications are for a continued high general level of business for most of 1957, and, of particular importance to increased business for the gas industry, it appears that new home building will continue on a fairly high level, probably in excess of 1,000,000 non-farm residences. With the general business atmosphere favorable, the problem then rests in our own hands to meet competition for consumers' interest.

During 1957 we should reap increased benefit from the cooperation of all branches of the gas industry in recognizing and facing up to competition. The inauguration of the gas industry's national TV show in January should stand out as a pace setter in our overall industry selling efforts.

One very specific problem on which I feel we should concentrate during the coming year is the matter of improving our competitive standing by up-grading the gas appliances being sold to our customers. The campaign for making all ranges "match-less" is perhaps the best example of this. Continued cooperation between the laboratories and appliance manufacturers on use of improved design for pilots, burners, and controls cannot help but bring worthwhile results. The surface burner temperature control feature should be exploited to the fullest to maintain the position of gas as the **Modern Fuel.**

I recognize, of course, that there are still problems to be solved, both on the national and local fronts. In the territory served by Northern Illinois Gas Company as well as in many others in the country, we still have the most serious problem of balancing our available flow gas, storage, and peak shaving abilities with the demands of our customers. Of course, a vital part of the answer to this problem is reaching the proper balance between costs of the various elements involved, and the value of the service to the ultimate consumers of each class. We know that these problems cannot all be solved immediately and their ultimate solution will require increasing compromise between elements of the industry and the highest type of statesmanship in settling the regulatory problems involved.

I believe that looking much further ahead there is a risk that we currently are not drawing an adequate supply of college graduates, technical, and other, into our industry. On the other hand, we recognize the problem and have it under study in the AGA Personnel Committee. I also am sure that we will continue to make every effort to limit the use of our highly-trained people to jobs requiring such training, and turn over an increasing number of routine chores to personnel that we ourselves can educate to fulfill such duties.

OUTLOOK FOR 1957

Industry Gains to Continue At Brisk Pace in 1957 . . .

Dean Mitchell,
President
Northern Indiana Public Service Company

Northern Indiana Public Service Company, serving one of the fastest growing and most diversified territories in the Midwest, looks to 1957 as another year of substantial gains running parallel to general growth trends of the gas utility industry. In recent years, gas sales have accounted for slightly more than 40 per cent of our operating revenues in a 12,000-sq mile area running east-west from Ohio to Illinois and north-south from Michigan to the Wabash River.

The gas industry as a whole will show significant increases in customers, sales, revenues, and capital expenditures. Our company will follow a similar pattern.

Northern Indiana shares the industry's optimistic outlook for gas air conditioning, which appears to hold one of the greatest potentials in the appliance and equipment field. A large market exists at present and the potential for the next several years is tremendous.

The gas industry, indicative of its aggressive and competitive spirit, has demonstrated strong unity of purpose by embarking on national network television, starting January 10 as a sponsor of *"Playhouse 90."* This forward-looking promotional endeavor should result in greater prestige for the gas industry's important role in our nation's economy and steadily increasing sales of gas appliances with advanced automatic features and dramatic new styling. Northern Indiana Public Service looks upon this new venture as one which will pay real dividends for the entire industry.

Natural Gas Popularity Increases Rapidly in Pacific Northwest

Charles H. Gueffroy,
President
Portland Gas & Coke Company

The Pacific Northwest will contribute substantially to continued growth of the gas utility industry during 1957. Coming of natural gas just in the past four months to its last great consumer region has reversed a long-standing local trend, and now the Northwest's distributors are gaining rapidly.

Natural gas brings an important source of thermal energy to Northwest industry. This is the first region to obtain enough of the new fuel at the outset to make allocation unnecessary; in fact, off-peak supplies loomed so large that prices on interruptible gas were set well below those for industrial oil to encourage volume sales.

Industrial sales have been spectacular as a result. The larger utilities of the area have already contracted virtually all of their interruptible gas commitments for the next five years. Two-fifths or more of this gas will go to the wood processing industry, which is the Northwest's largest. But it already is helping to attract new enterprise, such as a new glass container factory in Portland and anhydrous ammonia plant located inland on the Columbia River.

When Canadian Peace River gas flows into the Northwest late in 1957, added to that now coming from the San Juan Basin, the supply will be much larger than it is today. This will involve the first large importation of Canadian gas.

Natural gas has come at a historical moment when it is most needed. Rising prices for oil are accelerating the demand for the new fuel. The Northwest's hydroelectric resource, though large, is too limited and not suitable for extensive use as thermal energy. But the team of natural gas hydro-power and plentiful water will work together in developing the area's industrial potential.

Gas utilities may feel a check-rein on their expansion plans in 1957 from the twin forces of rising construction costs and higher rates for new capital, but this is a problem facing most industries. Popularity of gas service will exert the pressure needed to keep the industry moving forward.

Chicago Market Growth Continues; Gas Supply Remains Problem . . .

Eskil I. Bjork,
President
The Peoples Gas Light and Coke Company

The gas industry is faced with certain growth in 1957. The increase in population and the continuing expansion of facilities for transporting natural gas to markets is evidence of that.

Present forecasts of population growth indicate that our population will be about 176,000,000 in 1960, with a consequent increase in the number of families to be served by gas utilities.

Forecasts of business activity during 1957 also appear to be optimistic — at least as good as 1956 — which foreshadows a continuation of growth in the industrial and commercial markets.

It is becoming more and more apparent that the gas industry's market development in the years ahead is going to be temporarily slowed down by the delivery schedules on large diameter steel pipe. The international situation may have a future bearing on such delivery schedules.

For Chicago, the current estimate of gas sales, in therms, for 1957 indicates an increase of approximately 9 per cent, with about a 5 per cent increase in revenues.

Peoples Gas will continue to carry on vigorous promotional efforts to maintain its cooking load and to improve its other

residential loads through the promotion of sales of refrigerators, clothes dryers, automatic water heaters, and other domestic appliances.

Expansion of the industrial and commercial markets, including air conditioning, will also be our objective.

Gas supply, rather than the market for gas, continues to be the focal point. Now pending before the Federal Power Commission and scheduled for hearing early in January, 1957, is an $80,000,000 expansion program of Natural Gas Pipeline Company of America, a subsidiary, involving an increase of about 485,000,000 cu ft per day in its pipe line delivery capacity. The completion of that program, probably in the fall of 1958, will permit Peoples Gas to then offer gas for space heating to many additional thousands of Chicago customers now on its waiting list.

Of significant importance in the long term gas supply situation of the Peoples Gas pipe line subsidiaries was the recent approval by the Federal Power Commission of the application of Natural Gas Pipeline Company to extend its transmission system into Jack and Wise counties, Texas, an area with a rich potential in terms of future gas supplies.

Natural, during 1957, will build a 350-mile pipe line into the area at a cost of approximately $36,000,000, and the line will traverse other uncommitted gas fields.

Long strides forward have been made by the Peoples Gas system since the end of World War II in increasing the quantities of natural gas available in the Chicago area for market development. These efforts will continue unabated.

Needed — More Wear on Shoe Soles, Not Pants Seats — to Produce Sales

B. C. Adams, Sr.
Chairman of the Board
The Gas Service Company

The gas utility industry should have a bright future in 1957 and the years ahead if sufficient progressive spirit is shown. However, we are going to have to fight harder for our share of the business and must have unbounded faith in the future of the gas industry. Intensification and expansion of sales activities are of utmost importance to insure continued enthusiastic acceptance of our fuel and appliances.

Much of our effort should be devoted toward the cooking load. This is where our competitors are making their greatest inroads and we should meet the challenge head on by taking off the kid gloves. We have a superior service — we should sell it.

One of the brightest spots on the horizon for the future of the gas industry is gas air conditioning. Progress has been made in the commercial field and a very satisfactory off-peak load is being secured in our area. Our industry has a great economy of operation story to tell about gas air conditioning. We must let more people know that we are in the air conditioning business. Our greatest need is for satisfactory residential air conditioning units which can be sold at a competitive price. I would not hesitate to predict that if we had such air conditioning equipment, we could add 10 billion cu ft annually to our area to our off-peak load by 1970. It doesn't take a slide rule to figure what such a load could mean to the stability of the earnings in the gas industry.

Our company is privileged to distribute natural gas in the heart of the nation. This is a prosperous, growing, and progressive area and we are keeping step with the growth. Approximately 20,000 customers have been added each year for the past 10 years and we expect this growth to continue, perhaps slightly reduced during 1957, but continuing at a high level for several years to come.

Free customer service is our best insurance for holding the good will of our present customers and winning new ones. Realizing that the customer's gas service can be no better than the condition of the appliances which he uses, our company has adopted a policy of upgrading equipment and of providing free service for all gas-burning appliances, whether we sold them or not. Certainly such service costs a lot of money, but we are getting dividends in good will for our investment.

The gas distribution companies of the nation would not have to be fighting so desperately competitive-wise if the pipe line companies were carrying their full share of the costs of promoting markets, developing research programs, and helping present advertising messages to the gas customers.

One only has to look at the list of contributors to the gas industry's new television program to see that the distribution companies are carrying the substantial share of the costs. Yet, with their more flexible opportunities to retain earnings, the pipe line companies could stand this additional expense better than most of the distributing companies who are supporting it so willingly.

I believe that The Gas Service Company and all facets of the gas industry have an excellent future if we become more sales minded and wear out a little more of our shoe soles instead of our pants.

Philadelphia Gas Works to Reach 500,000,000 Capacity by Year's End

Charles G. Simpson, *General Manager*
Philadelphia Gas Works Division,
The United Gas Improvement Company

By the end of 1957, the Philadelphia Gas Works will have reached the manufacturing and pumping capacity of 500,000,000 cu ft of 720 Btu town gas per day — an increase of 3½ times its capacity a decade ago.

The Gas Works, owned by the city and operated under contract by The United Gas Improvement Company, will complete the major part of its post-World War II expansion program during this year. The peak of our borrowing will be reached in 1958, after which it is our goal to decrease debt on a pay-as-you-go program for financing improvements and expansion. It is expected that the capital needs for the next five years can be financed on this basis and that the present gas rates can be maintained, without increase, throughout the five-year period.

In this connection, it should be noted that despite the rising costs of labor, gas, construction, and other factors in operating expense, Philadelphia's gas rate, among the very lowest on the Eastern Seaboard, has not been increased in the past five years. Substantial gains in gas sales and operating economies have made this possible.

In the new building field, we expect that approximately 5000 new residences will be erected during 1957 and that over 97 per cent of them will use gas for cooking, water heating, and space heating. About 90 per cent of these homes will be equipped with modern built-in types of gas ranges. In addition, sales by Philadelphia plumbers and retailers will include 20,000 gas ranges, 40,000 gas water heaters, 8500 gas house heaters and 4000 gas clothes dryers.

The increase in new customers and the growing demand of existing customers will require construction of about 105 miles of mains and services. This element of our expansion program alone will cost about $4,100,000.

We will spend another $2,000,000 to bring our capacity for making and pumping gas to the all-time high of 500,000,000 cu ft.

In addition, we will spend $2,250,000 on replacements in our distribution system. Nearly 20 per cent of this amount must be spent, not because of age or worn-out equipment but because of civic improvements that require relocation of our lines. These include construction of new express highways for automobiles, replacement and construction of bridges, and other changes and construction which are not connected with gas service.

One of the most important factors in the growing use of gas in Philadelphia is the dependability of our gas supply. We have spent almost $3,000,000 to date to insure that the gas supply will be continuous under foreseeable conditions. The investment of an additional $100,000 in 1957 will substantially complete this program. The major part of this improvement, both in cost and in importance to the gas user, has been the installation at each plant of 26 tanks of 30,000-gal capacity each for storing LPG. This is used when natural gas flow is not great enough to meet the demand — for instance, on bitter cold days when much greater quantities are used for heating homes. Of course, this also is protection against an interruption in the supply for natural gas.

Most Productive Years for Industry Just Ahead . . .

H. A. Eddins,
President
Oklahoma Natural Gas Company

I believe the gas industry is heading into its best and most productive years.

The great increase in customers nationally is in itself a gratifying criterion for the future. Add to this the improvements in design of domestic appliances; the growing number of new appliances, both domestic and commercial; the new industrial applications spurred on by American ingenuity and the age of automation; and the picture is a pleasant one to contemplate. All these factors, plus a new feeling of confidence and optimism on the part of gas industry people, augurs well for the future.

In Oklahoma Natural Gas Company we estimate a growth in total customers from 347,000 to 405,000 by the end of 1961, and during that time we will invest an estimated $59,000,000 in plant expansion and improvements.

Factors, favorable to a greater industrialization of the area we serve, are drawing a number of plants to Oklahoma and this, too, will be a stimulus to our future growth.

Gas industry growth, no matter how optimistic we may be about it, will not materialize without a struggle. We are in a highly competitive era — perhaps the most competitive in the memories of those now guiding our industry. Some have been prone to take the easy way, but there is no easy way if we are to fulfill our destiny rather than stand still and watch opportunities go by. Our competition is geared to big production and will make every effort to grow at our expense. Manufacturers of gas equipment need every encouragement we can give them—not passive but the hard hitting assistance that will create for them markets so profitable they cannot be ignored. I feel that the renewed spirit of confidence that now pervades the gas industry will add vitality to our program.

Industry's Self-Appraisal Significant to Future Growth . . .

Dale B. Otto,
President
New Jersey Natural Gas Company

The high level of the national economy, and more significantly the vigorous economy of the State of New Jersey, provides a vehicle for New Jersey Natural Gas Company's continued expansion.

The area served by this company has undergone a residential building boom in recent years. Of all of these new homes, 87 per cent are heating with gas.

The rebirth of the competitive spirit of the industry that has resulted from the industry's searching self-appraisal spearheaded by AGA's Gas Industry Development Committee is probably the most significant factor to be considered in forecasting the industry's future.

We are not only growing with our communities but are reversing trends that were established by competitive fuels attacking our base and, what some were naive enough to believe were, "our" loads.

The industry is staffed with capable, vigorous leaders, who are attracting to them well qualified personnel. Perhaps not in numbers some would consider desirable; however, in sufficient numbers to assure us youth and vigor in our programs.

The excellent research work of the PAR Committee, augmented by that being done by manufacturers, must be accelerated if we are to be assured of a continued flow of new and improved appliances.

From the Christmas tree to the burner tip, I believe the industry is aware of the job that must be done, and is capable of improving our relative position in the nation's economy.

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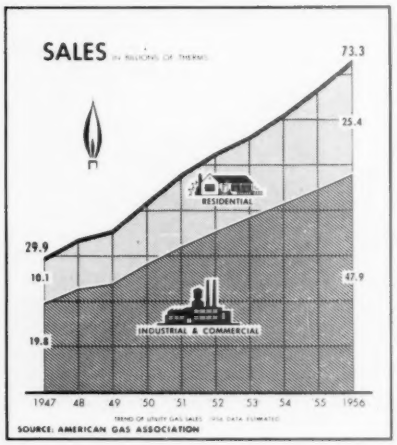
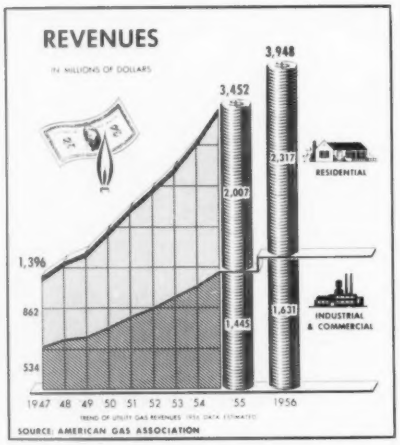
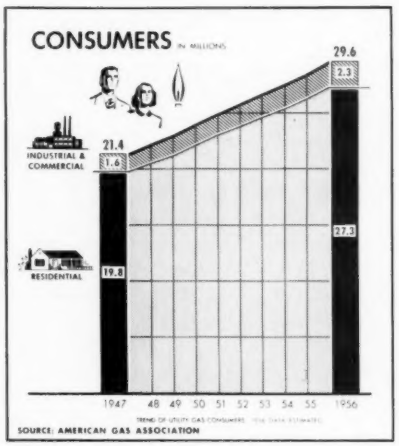






With Record Year Under Its Belt . . .

Gas Utilities Look Toward 1957 With Enthusiasm and Optimism

C. H. Zachry, *President, American Gas Association*

THE gas utility and pipe line industry, now serving more than 30,000,000 customers through half a million miles of gas mains in every state and the District of Columbia, continued its dynamic growth pattern during 1956 to reach record-breaking peaks. Even greater achievements in all phases of operation are confidently expected in 1957.

With revenues from utility sales now at an all-time high of nearly $4 billion, residential, commercial and industrial use of gas are increasing steadily. Meanwhile, natural gas reserves have also reached unprecedented peaks.

Record-breaking expenditures of $1.65 billion during 1956 for new facilities to serve more customers reflected the dramatic progress of the industry. The gas industry currently has total assets of about $17½ billion with the prospect of reaching $24 billion by 1960 for almost a quadruple gain in a decade and a half.

A major gas industry development during 1956 was the completion of the $230,000,000 "Scenic Inch" pipe line from the Southwest to the border of Canada to bring natural gas to the Pacific Northwest for the first time. The last large region of the U. S. to receive natural gas, the Pacific Northwest is expected to make significant contributions to the gas industry's continued growth in the immediate future, meanwhile boosting its own industrial stature to new heights.

Statistical Gains in 1956

During 1956, the gas utility industry served an average of 29,602,300 customers, a new peak, including 219,300 LPG customers served directly by gas utility companies. This was a gain of 1,123,500 customers over 1955, when the industry was serving 28,478,800 residential, commercial, industrial, and other (such as armed forces and other government installations) customers. It is estimated that there are about 8,000,000 customers served with LPG in areas not on utility mains.

An average of 25,019,000 customers received natural gas during the year, a gain of 2,154,000 customers and an increase of 9.42 per cent over the 22,864,200 natural gas customers served during 1955.

Manufactured and mixed gas customers averaged 4,364,000 during 1956. Approximately 1,400,000 former users of manufactured or mixed gas became natural gas customers during the year.

OUTLOOK FOR 1957

Total sales by the gas utility industry during 1956 reached 73.35 billion therms, a new record. This was a gain of 9.62 per cent over the 66.91 billion therms sold in 1955.

Natural gas sales achieved a new high of 69.90 billion therms, up 10.36 per cent over the 63.34 billion therms sold a year earlier. Manufactured and mixed gas sales totaled 3.37 billion therms.

Revenues from utility sales of gas achieved a new record total of $3.948 billion, a gain of 14.35 per cent over the previous record high of $3.452 billion established in 1955. Natural gas revenues increased 17.29 per cent to a total of $3.483 billion, also an all-time record. Manufactured and mixed gas revenues were $445,000,000, compared with $463,000,000 in the previous year. Gas industry revenues for 1957 are estimated as $4.260 billion.

Pipe Lines and Gas Reserves

Approximately 20,000 miles of gas mains were constructed in 1956 to bring the total mileage to 517,000.

Underground storage operations have also been increased substantially. At the start of 1956, there were 178 underground storage pools located in 19 states. The 6746 active storage wells in these pools had an ultimate capacity of 2.1 trillion cu ft.

An additional 10 pools under construction at the start of 1956 were estimated at a capacity of 81.7 billion cu ft of storage space for the underground storage of natural gas. With new gas househeating customers to be added at an estimated rate of 1,300,000 annually during the next few years, underground storage of gas becomes an increasingly important factor in stabilizing the gas load.

The gas industry spent $61,000,000 on construction of underground storage facilities in 1956 and will spend $45,000,000 on such facilities in 1957.

Proved recoverable reserves of natural gas at the beginning of 1956 were at a record high of 223.7 trillion cu ft, an increase of about 12 trillion cu ft over reserves at the start of 1955. These new reserves more than offset record net production of 10.1 trillion cu ft in 1955, up from 9.4 trillion cu ft the previous year.

A Look Into the Future

The gas industry will continue to grow on all fronts in 1957.

When the 30 millionth customer was added in mid-December, our industry could point to doubling its number of customers in less than two and a half decades. An average of 30,500,000 customers will be served in 1957, with unitization of 77.6 billion therms of gas. By 1960, the prospect is for the sale of 92 billion therms, of which 32 billion therms will be residential sales. And in 1965, we should show aggregate sales of 116 billion therms, an increase of almost 73 per cent from the current level and nine times the figure of two decades ago.

Th number of customers will continue to increase steadily to an estimated 33,000,000 — 31,000,000 of whom will be residential customers — in 1960 and 38,250,000 by 1965, including 35,300,000 residential users.

With gas replacing oil as the leading heating fuel for U. S. homes, house-heating customers of gas utilities will jump from 16,000,000 now to 21,000,000 by 1960 and 27,500,000 by 1965. Gas-heated homes represented about 46 per cent of the more than 49,000,000 occupied homes and apartments in the U. S. as of mid-1956.

The industry's record construction expenditures of $1.65 billion during 1956 are expected to be surpassed in 1957. The AGA Bureau of Statistics forecasts 1957 expenditures at $1.954 billion. The gas industry's expenditures will be an important factor in the two per cent U. S. gain for private building construction predicted for 1957 by the U. S. Commerce and Labor Departments. About 96 per cent of the gas industry's expenditures during the coming year will be for facilities of natural gas systems.

Expenditures between now and 1965 to meet the growing demand for gas service in all parts of the country will total about $1.9 billion, almost twice the amount spent in the previous 10 years and more than 20 times as great as the amount spent in the decade immediately preceding World War II.

Gas Air Conditioning

A field in which the gas industry is now focusing a major share of its effort is air conditioning. The AGA and manufacturers together have spent $1,500,000 in 1956 alone to develop

TOTAL GAS UTILITY INDUSTRY CUSTOMERS, SALES AND REVENUES

Preliminary 1956 Compared with 1955

	1956	1955	Per cent change
Customers (at Dec. 31)			
Residential	27,788,800	26,903,000	+3.29%
Commercial	2,192,800	2,127,000	+3.09
Industrial	128,300	123,300	+4.06
Other	30,000	27,000	—
Total	30,139,900	29,180,300	+3.29
Customers (Average)			
Residential	27,324,700	26,282,600	+3.96
Commercial	2,122,200	2,047,500	+3.65
Industrial	126,400	121,200	+4.29
Other	29,000	27,500	—
Total	29,602,300	28,478,800	+3.95
Sales (thousands of therms)			
Residential	25,390,500	22,386,700	+13.42
Commercial	6,648,100	6,029,300	+10.26
Industrial	38,864,300	35,350,500	+ 9.94
Other	2,446,700	3,148,400	—
Total	73,349,600	66,914,900	+ 9.62
Revenues			
Residential	$2,316,993,000	$2,007,450,000	+15.42
Commercial	484,360,000	424,090,000	+14.21
Industrial	1,077,405,000	937,591,000	+14.91
Other	68,925,000	83,069,000	—
Total	3,947,683,000	3,452,200,000	+14.35

NATURAL GAS CUSTOMERS, SALES AND REVENUES

Preliminary 1956 Compared with 1955

	1956	1955	Per cent change
Customers (at Dec. 31)			
Residential	[24,124,000	21,933,000	+ 9.99
Commercial	1,951,000	1,774,000	+ 9.98
Industrial	108,000	92,000	+17.39
Other	28,000	25,000	—
Total	26,211,000	23,824,000	+10.02
Customers (average)			
Residential	23,058,000	21,084,800	+ 9.36
Commercial	1,833,000	1,665,700	+10.04
Industrial	101,000	88,700	+13.87
Other	27,000	25,000	—
Total	25,019,000	22,864,200	+ 9.42
Sales (thousands of therms)			
Residential	23,027,100	20,085,700	+14.64
Commercial	6,222,300	5,534,500	+12.43
Industrial	38,234,200	34,600,300	+10.50
Other	2,413,900	3,116,900	—
Total	69,897,500	63,337,400	+10.36
Revenues			
Residential	$1,967,954,000	$1,656,883,000	+18.77
Commercial	420,822,000	351,897,000	+19.59
Industrial	1,027,692,000	880,225,000	+16.75
Other	66,712,000	80,587,000	—
Total	3,483,180,000	2,969,592,000	+17.29

gas air conditioners. Compact design, economy, and reliability of operation are making gas air conditioning units a reality of today — not a dream of the future.

At least 10 reputable manufacturers are now in the gas air conditioning field — already producing units or developing field test units or conducting intensive research before starting production.

Surveys have shown a present market for 250,000 central air conditioning home units, a five-fold increase in air-conditioned manufacturing plants by 1980 as compared with 1953, and a constantly growing market in the commercial field.

Gas air conditioning units for the home include exciting new developments in the field of year-round climate control by combined heating-cooling systems, which will control humidity as well as temperature throughout the house. The gas industry recognizes that air conditioning is the "wave of the future" in the home and is going all out to meet it.

Other Appliances and Equipment

An all-time record of 2,837,000 automatic gas water heaters were shipped by manufacturers during 1956. This volume was accompanied by a marked upgrading in size and quality.

Exceeding 2,000,000 units for the tenth straight year, shipments of free-standing gas ranges totaled 2,036,000. And this figure does not include approximately 160,000 built-ins, whose popularity has been growing at such a fast pace that built-ins may provide 10 per cent of the gas range market in 1957.

Shipments of direct heating units climbed to 1,700,000 for a gain of 16 per cent over 1955. This substantial increase more than offset small declines for wall heaters and floor furnaces, which totaled 301,000 units and 134,000 units, respectively, during 1956.

Automatic gas clothes dryers surged to 470,000 units, a gain of nearly 28 per cent over last year's 368,000. Makers of gas incinerators also enjoyed another good year and anticipate a continued increase in demand in the immediate future.

Boiler shipments also achieved a record high of 98,000 units, a gain of nearly nine per cent above 1955. Warm air furnaces approximated 829,000 units, compared with record shipments of 835,000 in 1955. Conversion burner shipments aggregated 198,000 for a slight decrease from 209,100 the previous year.

A boom in home modernization and the growth of new markets helped gas appliance and equipment manufacturers achieve an impressive year despite a 15 per cent drop in new housing starts.

More than 90,000,000 gas appliances now are used by residential customers of the gas industry. The outlook for the near future is very bright, with potential sales of 57,000,000 additional appliances seen by 1960 — and a staggering total of 300,000,000 predicted by 1974.

Promotion, Advertising, and Research

The gas industry took an important step forward during 1956 when it completed arrangements for its first use of national network television. Scheduled for debut on Thursday, January 10, 1957, the television program was made possible by the unified efforts of gas utilities, transmission companies, and manufacturers who subscribed more than $2,250,000 a common purpose for the good of the entire industry.

In addition to providing support for the new television show, utility companies subscribed more than $3,000,000 in 1956 to the Promotion, Advertising, and Research (PAR) Plan, which completed its twelfth successful year of coordinated activities embracing promotion, advertising, utility company research, pipe line research, and public information.

PAR's National Advertising Program scheduled more than $1,000,000 in 30 magazines with a reader circulation of about 44,000,000. This represented 206 pages of advertising with a total of 226,867 sales messages. Many major manufacturers cooperated with the gas industry in space-sharing advertising.

The PAR Public Information Program expanded its activities to build a strong public relations team to benefit all segments of the industry. Among the principal projects were increased services to win employee understanding and support, more emphasis on telling the facts on government in gas, greater stimulation of coordinated local

MANUFACTURED AND MIXED GAS CUSTOMERS, SALES AND REVENUES
Preliminary 1956 Compared with 1955[a]

	1956	1955	Per cent change
Customers (at Dec. 31)			
Residential	3,474,000	4,758,000	—26.99%
Commercial	223,000	331,000	—32.63
Industrial	20,000	31,000	—35.48
Other	2,000	2,000	—
Total	3,719,000	5,122,000	—27.39
Customers (average)			
Residential	4,068,000	4,979,200	—18.30
Commercial	269,000	360,200	—25.32
Industrial	25,000	32,200	—22.36
Other	2,000	2,500	—
Total	4,364,000	5,374,100	—18.80
Sales (thousands of therms)			
Residential	2,304,200	2,246,200	+ 2.58
Commercial	401,400	471,600	—14.89
Industrial	628,000	747,600	—16.00
Other	32,400	31,100	—
Total	3,366,000	3,496,500	— 3.73
Revenues			
Residential	$334,504,000	$336,289,000	— 0.53
Commercial	58,643,000	67,407,000	—13.00
Industrial	49,247,000	56,810,000	—13.31
Other	2,153,000	2,413,000	—
Total	444,547,000	462,919,000	— 3.97

(a) Reflects operations of fewer companies in 1956 than in 1955 because of conversions to natural gas.

MIXED GAS CUSTOMERS, SALES AND REVENUES
Preliminary 1956 Compared with 1955[a]

	1956	1955	Per cent change
Customers (at Dec. 31)			
Residential	2,935,000	3,840,000	—23.57%
Commercial	188,000	228,000	—17.54
Industrial	19,000	26,000	—26.92
Other	1,000	1,000	—
Total	3,143,000	4,095,000	—23.25
Customers (average)			
Residential	3,385,000	3,818,900	—11.36
Commercial	208,000	231,600	—10.19
Industrial	23,000	26,500	—13.21
Other	1,000	1,200	—
Total	3,617,000	4,078,200	—11.31
Sales (thousands of therms)			
Residential	2,107,900	2,011,300	+ 4.80
Commercial	318,500	350,500	— 9.13
Industrial	590,800	667,600	—11.50
Other	15,700	9,800	—
Total	3,032,900	3,039,200	— 0.21
Revenues			
Residential	$287,473,000	$277,787,000	+ 3.49
Commercial	41,330,000	42,335,000	— 2.37
Industrial	44,572,000	47,137,000	— 5.44
Other	1,150,000	933,000	—
Total	374,525,000	368,192,000	+ 1.72

(a) Reflects operations of fewer companies in 1956 than in 1955 because of conversions to natural gas.

MANUFACTURED CUSTOMERS, SALES AND REVENUES
Preliminary 1956 Compared with 1955[a]

	1956	1955	Per cent change
Customers (at Dec. 31)			
Residential	539,000	918,000	—41.29%
Commercial	35,000	103,000	—66.02
Industrial	1,000	5,000	—80.00
Other	1,000	1,000	—
Total	576,000	1,027,000	—43.91
Customers (average)			
Residential	683,000	1,160,300	—41.14
Commercial	61,000	128,600	—52.57
Industrial	2,000	5,700	—64.91
Other	1,000	1,300	—
Total	747,000	1,295,900	—42.36
Sales (thousands of therms)			
Residential	196,300	234,900	—16.43
Commercial	82,900	121,100	—31.54
Industrial	37,200	80,000	—53.50
Other	16,700	21,300	—
Total	333,100	457,300	—27.16
Revenues			
Residential	$47,031,000	$58,502,000	—19.61
Commercial	17,313,000	25,072,000	—30.95
Industrial	4,675,000	9,673,000	—51.67
Other	1,003,000	1,480,000	—
Total	70,022,000	94,727,000	—26.08

(a) Reflects operations of fewer companies in 1956 than in 1955 because of conversions to natural gas.

LIQUEFIED PETROLEUM GAS CUSTOMERS, SALES AND REVENUES
Preliminary 1956 Compared with 1955[a]

	1956	1955	Per cent change
Customers (at Dec. 31)			
Residential	190,800	212,000	—10.00%
Commercial	18,800	22,000	—14.55
Industrial	300	300	—
Other	a	a	—
Total	209,900	234,300	—10.41
Customers (average)			
Residential	198,700	218,600	— 9.10
Commercial	20,200	21,600	— 6.48
Industrial	400	300	+33.33
Other	a	a	—
Total	219,300	240,500	— 8.82
Sales (thousands of therms)			
Residential	59,200	54,800	+ 8.03
Commercial	24,400	23,200	+ 5.17
Industrial	2,100	2,600	—19.23
Other	400	400	—
Total	86,100	81,000	+ 6.30
Revenues			
Residential	$14,535,000	$14,278,000	+ 1.80
Commercial	4,895,000	4,786,000	+ 2.28
Industrial	466,000	556,000	—16.19
Other	60,000	69,000	—
Total	19,956,000	19,689,000	+ 1.36

(a) Reflects operations of fewer companies in 1956 than in 1955 because of conversions to natural gas.

PR action, and a stepped-up program of favorable national publicity on gas.

Through special campaigns, merchandising aids, trade show exhibits, educational campaigns, tie-ins with motion pictures and television, and many similar projects, PAR's promotion activities reached new highs in the interest of expanding the appliance market and the gas industry as a whole.

The Gas Industry Development Program intensified its nationwide activities through round-table conferences for gas company executives and clinics for sales managers in many cities, as well as two major regional sales conferences. A complete sales and promotional program to increase automatic gas range sales was made available to gas utility companies for use at the local level.

The Mrs. America Contest, sponsored by AGA for the fourth year, is making the winner (this year Mrs. Cleo Maletis of Portland, Oregon) synonymous with the national gas industry in the minds of America's homemakers. One hundred gas utility companies, representing 15,000,000 meters, participated in 1956. The 1957 contest will be held at Fort Lauderdale, Florida.

AGA Laboratories

More than 5500 gas appliances and accessories were tested by AGA Laboratories for compliance with requirements and the privilege of displaying the Laboratories Approved Seal or Listing Symbol. Many of these were advanced designs and the majority incorporated major improvements.

Central gas heating appliances, which accounted for about half of all appliances tested, featured compactness and eye-appeal design. Most of these appliances were also designed for operation at higher static pressure, so that they can be readily used with add-on cooling units for summer air conditioning.

Automatic top burner controls are available now on practically all ranges. Several manufacturers equipped ranges with an oven thermometer which operates to turn off the gas when food has been cooked to the exact degree desired.

Operational improvements were made in automatic gas clothes dryers, a number of which have increased their drying speed to insure the fact that gas continues to provide the fastest way of drying clothes.

The continuing high level of research activity promises continued industry progress in the appliance field. Twenty PAR-financed research projects, seven of them completed, are under study at the Laboratories. Major emphasis in 1956 was on the development of domestic gas incinerators and commercial cooking equipment. Eleven research bulletins and reports were published, covering industrial and commercial gas research, and domestic gas utilization research.

The inspection program was accelerated by increasing unannounced visits to manufacturing plants and expansion of field tests. Eighteen revised appliance and accessory standards were adopted and 19 revised standards were submitted to the industry for study. Indication of the widespread interest in the gas industry's national standards was reflected in an all-time high for sales of requirement publications.

Conclusion

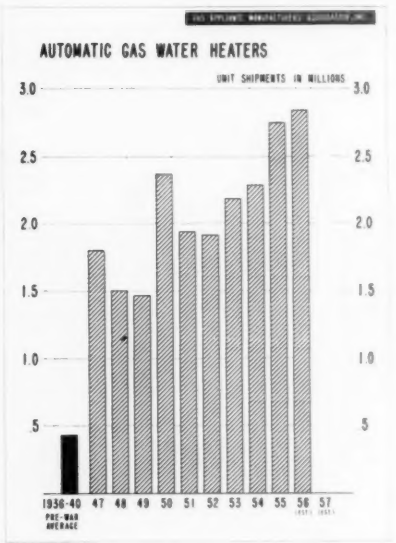
"Growth" is the byword of the gas utility and pipe line industry — today and for years to come. There is every reason for the greatest optimism regarding the prospects for many millions of additional satisfied customers of clean, economical, reliable, convenient gas service. The industry will continue to meet the needs of its residential, commercial, and industrial customers for efficient, up-to-the-minute gas appliances and equipment.

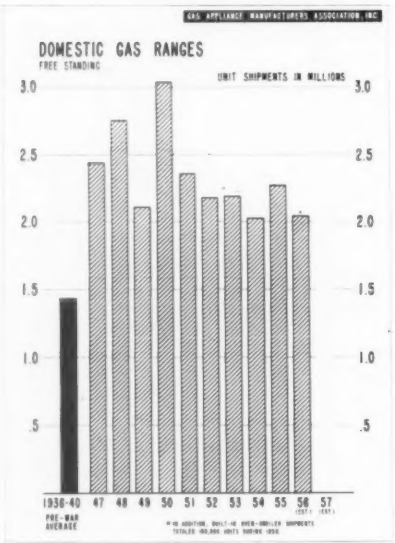
Gas air conditioning, it should be emphasized, presents an enormous potential for our industry. Modern installations are already proving themselves — from shopping centers to factories, from homes to hotels and hospitals. Gas air conditioning must be regarded as an accomplishment of today, not a promise for tomorrow.

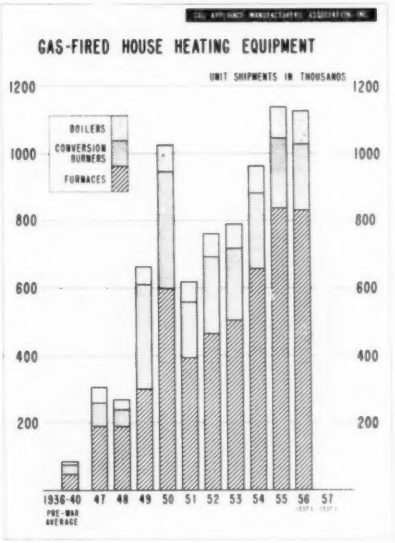
The growth picture of the gas industry can be seen in our outlook for net annual production of natural gas to 22½ trillion cu ft by 1975 — more than double the 1955 net production. Meanwhile, natural gas reserves are expected to increase steadily, just as they have been doing year after year.

The gas industry will continue to provide the best service possible to more than 30,000,000 present customers and to the millions of new customers to be added in the future. ★ ★

OUTLOOK FOR 1957







Backed by Industry-wide Unity . . .

New Markets, Home Modernization Boom Spark Bright Outlook for 1957

Julius Klein, *President, Gas Appliance Manufacturers Association*

NEW markets and a boom in home modernization enabled the gas appliance and equipment industry to offset the effect of a drop in new-home starts during 1956, and there are strong indications that the industry will top its 1956 performance in 1957.

Manufacturers in some categories equalled or surpassed all-time records established in 1955. For example, manufacturers of automatic gas water heaters shipped 2,837,000 units, 3.2 per cent above the 1955 peak, and they are confident that gas water heaters will approach or top the 3,000,000 mark in 1957. It's worth noting that record unit volume is accompanied by a marked upgrading in size and quality. Larger families, extra bathrooms, automatic washing machines, and dishwashers require more hot water, and these requirements provide a continuing stimulus to the demand for bigger and better automatic gas water heaters.

Shipments of gas central heating equipment were about even with the 1955 peak, and the 1,125,000 unit total for 1956 established gas as the number one heating fuel in the nation's homes.

Warm air furnaces approximated 829,000 units, down slightly from the record 835,000 shipped in 1955. Boilers established a new all-time high of 98,000 units, nearly nine per cent above 1955, while conversion burners slipped from 209,100 units to 198,000.

Heating Equipment

Continuation of the multi-billion-dollar expansion of the natural gas pipe line system during the past year enabled gas utility companies and manufacturers in many areas to cut into the backlog of thousands of applications for gas house heating that were held up pending completion of expanded transmission and distribution facilities.

Gas direct heating equipment benefited substantially from the home-modernization trend, particularly from projects involving the addition of rooms or enclosed porches. Shipments of the direct heating units—designed to heat the room or space in which they are installed — totaled 1,700,000 units, more than 15 per cent above 1955.

The increase in direct heating shipments more than offset losses in vented recessed wall heaters and floor fur-

naces which were adversely affected by a decline in housing starts in areas where these units are most popular. Wall heater shipments were off 15 per cent to 301,000 units, and floor furnaces down 13 per cent to 134,000.

Gas clothes dryers continued to move ahead strongly to establish an all-time high, with shipments topping the 450,000 mark for the first time in history. The clothes dryer demand continues to mount, and shipments in 1957 will undoubtedly set another record somewhere beyond the 500,000 mark.

Makers of gas incinerators enjoyed a satisfactory year, and have high hopes for 1957. New and improved models, a growing understanding on the part of municipal officials of the virtues of the gas incinerator, increased interest in incinerator sales by merchandising utility companies, and the acute disposal problems in many communities, all point to a rapid increase in demand.

Shipments of conventional or freestanding gas ranges were about 10 per cent below the 1955 total, but shipments exceeded 2,000,000 units for the tenth consecutive year, and a substantial part of the difference was made up in shipments of built-ins, which enjoyed an upsurge in sales. I believe the built-ins will provide more than 10 per cent of the gas range market in 1957, with built-in shipments passing the 250,000 mark.

Home Improvement Programs

Built-ins, hitherto utilized mostly in new homes, are now in greater demand for existing homes undergoing kitchen modernization. This demand will be stimulated further in 1957 by such national campaigns as Operation Home Improvement and ACTION — American Council to Improve Our Neighborhoods.

These campaigns are particularly important because they encourage improvement projects that will take up the slack should new home starts follow the predictions of a further decline in 1957. There are other important factors that provide the basis for optimism throughout the gas and gas appliance industries.

The arrival of natural gas in the Pacific Northwest in the fall of 1956 sparked a demand for all types of gas appliances and equipment—residential, commercial, and industrial. Manufacturers, particularly those on the West Coast, noted a quick surge in orders from Portland and Seattle when the pipe line reached those cities. The demand for gas service and appliances in the Northwest will continue to grow as additional communities are connected to the pipe line and as homes and industries convert to gas from other fuels.

Continued expansion of transmission and distribution facilities, in which the gas industry will invest $7 billion in the 1956-1959 period, will bring new or additional supplies of natural gas into hundreds of communities from coast to coast, to insure greater fuel supplies and a constantly growing market for gas appliances and equipment of all kinds.

The availability of adequate supplies of the natural fuel, and the re-examination of main extension policies by many utility companies will be of great importance in major new home developments, many of which were deprived of gas service in the past because of the lack of transmission and distribution facilities.

Industry Moves Ahead

I am sure we'll see a great wave of all-gas homes as the result of unprecedented cooperation between gas companies and builders. In other words, whether new home starts increase or decrease, the gas appliance industry will equip an increasing percentage of the new dwellings.

Perhaps the most important reason for optimism can be found in the gas industry's own plans for exploitation of all of its opportunities for service and sales.

Critics within the industry have complained for years that it has been under-promoted. That may have been true in the past. It will not be true in 1957.

All of the industry's important past promotion programs will be carried on again—the PAR program, Old Stove Round-Up, Mrs. America, New Freedom Kitchen & Laundry operations—and on a larger scale. In addition, new activities will provide sales impact unprecedented in our business.

Starting in January, the gas industry will have a top-flight network television program for the first time. Utility companies subscribed the bulk of more than $2,250,000 to underwrite this venture into this powerful medium, but the support of pipe line companies and manufacturers is indicative of a new spirit of cooperation among all segments of the industry that is certain to be reflected in sales.

Industry-wide Unity

Another example of effective cooperation is the formation of the **Gas Unity Committee** and the development of its program which involves utility companies, LPG dealers and the manufacturers as well as AGA, GAMA and LPGA in campaigns to sell the advantages of gas to the American homeowner—city gas or LPG, wherever he lives.

The Unity program is already operating in one form or another in eight states and is spreading rapidly. Newspaper advertising and highway signs—jointly sponsored by gas utility companies and LPG dealers are being used regularly and effectively. In addition, sales departments are exchanging market information and leads to promote maximum productivity in sales solicitations and follow-ups.

There are many other examples of the industry's determination to do an adequate promotion job. The **Gas Equipment Manufacturers Committee,** a group of gas industry suppliers who have nothing to sell to the general public, are about to enter the third year of the GEM program of national consumer advertising of the seven household uses of gas. The equipment manufacturers plan to increase their expenditures this year to more than $300,000.

The GAMA domestic gas range division is working out the details of a promotion program for the next two years, which is by far the most ambitious and comprehensive cooperative effort ever contemplated by any appliance or equipment division in the industry.

These and other promotion programs, coupled with the public relations efforts of GAMA, AGA and LPGA, mean that our gas and gas equipment will be kept constantly in the minds of all of our publics. The virtues of gas as a fuel and of modern automatic gas appliances as aids to better living will be better known during 1957 than ever before.

We have the finest array of appliances and equipment ever offered to consumers. We have better fuel distribution than ever before. With a zooming population we have the greatest market in history. And we have the best supported program to take advantage of our tremendous potential.

Will 1957 be a good year? I don't see how it can miss. * * *

IMPORTANT NOTICE!

. . . A Correction

To Readers of American Gas Journal Handbook Issue . . .

In the tables that accompany the article, "How to Compute Flow of Gas Through Orifice Meters," beginning on Page 76 of the November 15, 1956 Gas Handbook Issue, headings on three tables were accidentally transposed, and two incorrect tables were printed.

The Tables on pages 80, 81, and 85 have incorrect headings. Table 2, on Page 80, is actually Table 5-A, Reynolds Number factor, F_r; Table 2 on Page 81 is actually Pipe Diameter Factors, F_d — Flange Taps; and Table 5-A, on Page 85, should be labeled Pipe Diameter Factors, F_d — for Pipe Taps.

Tables 3 and 4 are not valid if used with the Table 1, which is based on 14.4 psia. The F_1 and F_x tables printed are based on a constant factor of 338.17 ($F_1 = 338.17\ K_o$ and $F_x = 338.17\ K_o\beta^2$) when they should have been based on a constant factor of 345.92 ($F_1 = 345.92\ K_o$ and $F_x = 345.92\ K_o\beta^2$) to be valid with the other coefficients.

On this and the two following pages are, for your convenience in making these corrections in your copy of the 1956 Gas Handbook, three correct heading strips and two corrected tables that can be cut out and pasted on the appropriate pages. *Please do this now to avoid possible future error.*

Please accept our sincere apologies for this error. We hope that none of our readers have been unduly inconvenienced. Thank you.

. . . The Editors.

Cut out and paste over the present heading on Page 80.

TABLE 5-A

Reynolds Number Factor, F_r
"b" Values for Flange Taps

$$F_r = 1 + \frac{b}{\sqrt{h_w p_f}}$$

Cut out and paste over the present heading on Page 81.

TABLE 2

Pipe Diameter Factors, F_d — Flange Taps

Cut out and paste over the present heading on Page 85.

TABLE 2

Pipe Diameter Factors, F_d — Pipe Taps

TABLE 3

Values of F_x — Flange Taps

β	0	1	2	3	4	5	6	7	8	9
0.10	2.060	2.101	2.143	2.185	2.227	2.270	2.313	2.356	2.400	2.445
0.11	2.489	2.535	2.580	2.626	2.673	2.720	2.767	2.815	2.863	2.911
0.12	2.960	3.009	3.059	3.109	3.160	3.211	3.262	3.314	3.366	3.419
0.13	3.472	3.525	3.579	3.633	3.688	3.743	3.799	3.855	3.911	3.968
0.14	4.025	4.083	4.141	4.199	4.258	4.318	4.377	4.438	4.498	4.559
0.15	4.620	4.682	4.744	4.807	4.870	4.934	4.998	5.062	5.127	5.192
0.16	5.258	5.324	5.390	5.457	5.524	5.592	5.660	5.729	5.798	5.868
0.17	5.938	6.008	6.079	6.150	6.221	6.293	6.366	6.439	6.512	6.586
0.18	6.660	6.735	6.810	6.885	6.961	7.037	7.114	7.191	7.269	7.347
0.19	7.426	7.504	7.584	7.664	7.744	7.824	7.905	7.987	8.069	8.151
0.20	8.234	8.317	8.401	8.485	8.569	8.654	8.739	8.825	8.911	8.997
0.21	9.084	9.172	9.260	9.348	9.437	9.526	9.615	9.705	9.795	9.887
0.22	9.978	10.069	10.162	10.254	10.347	10.440	10.534	10.629	10.723	10.818
0.23	10.914	11.010	11.106	11.203	11.300	11.398	11.496	11.595	11.694	11.793
0.24	11.893	11.993	12.094	12.195	12.297	12.399	12.501	12.604	12.707	12.811
0.25	12.915	13.020	13.125	13.230	13.336	13.443	13.549	13.657	13.764	13.872
0.26	13.981	14.090	14.199	14.309	14.420	14.530	14.641	14.753	14.865	14.977
0.27	15.090	15.204	15.317	15.432	15.546	15.661	15.777	15.893	16.009	16.126
0.28	16.243	16.361	16.479	16.598	16.717	16.837	16.957	17.077	17.198	17.319
0.29	17.441	17.563	17.686	17.809	17.933	18.057	18.181	18.306	18.431	18.557
0.30	18.683	18.810	18.937	19.065	19.193	19.321	19.450	19.580	19.710	19.840
0.31	19.971	20.102	20.233	20.366	20.498	20.631	20.765	20.899	21.033	21.168
0.32	21.303	21.439	21.575	21.712	21.849	21.987	22.125	22.264	22.403	22.542
0.33	22.682	22.822	22.964	23.105	23.246	23.389	23.531	23.675	23.819	23.963
0.34	24.107	24.252	24.398	24.544	24.690	24.837	24.985	25.133	25.281	25.430
0.35	25.579	25.729	25.880	26.030	26.182	26.333	26.486	26.638	26.792	26.945
0.36	27.099	27.254	27.409	27.565	27.721	27.877	28.035	28.192	28.350	28.509
0.37	28.668	28.827	28.987	29.146	29.309	29.470	29.632	29.795	29.958	30.121
0.38	30.285	30.450	30.615	30.780	30.946	31.113	31.279	31.447	31.615	31.783
0.39	31.952	32.122	32.292	32.462	32.633	32.805	32.977	33.150	33.323	33.496
0.40	33.671	33.845	34.020	34 196	34.372	34.549	34.726	34.904	35.082	35.261
0.41	35.441	35.621	35.801	35.982	36.163	36.346	36.528	36.711	36.895	37.079
0.42	37.263	37.449	37.634	37.821	38.008	38.195	38.383	38.571	38.760	38.950
0.43	39.140	39.331	39.522	39.714	39.906	40.099	40.292	40.486	40.681	40.876
0.44	41.071	41.268	41.464	41.662	41.860	42.058	42.257	42.457	42.657	42.858
0.45	43.059	43.261	43.464	43.667	43.870	44.075	44.280	44.485	44.691	44.898
0.46	45.105	45.313	45.521	45.730	45.940	46.150	46.360	46.572	46.784	46.996
0.47	47.209	47.423	47.637	47.852	48.068	48.284	48.501	48.718	48.936	49.155
0.48	49.374	49.595	49.815	50.036	50.258	50.480	50.703	50.927	51.151	51.376
0.49	51.602	51.830	52.054	52.282	52.510	52.739	52.968	53.198	53.429	53.660
0.50	53.892	54.125	54.358	54.592	54.826	55.061	55.297	55.534	55.771	56.009
0.51	56.247	56.486	56.726	56.967	57.208	57.451	57.693	57.936	58.181	58.425
0.52	58.671	58.917	59.164	59.412	59.660	59.910	60.159	60.410	60.661	60.913
0.53	61.165	61.419	61.673	61.928	62.183	62.440	62.697	62.954	63.213	63.472
0.54	63.732	63.993	64.255	64.517	64.780	65.044	65.309	65.574	65.840	66.107
0.55	66.375	66.643	66.913	67.183	67.454	67.725	67.998	68.271	68.545	68.820
0.56	69.096	69.372	69.650	69.928	70.207	70.486	70.767	71.048	71.330	71.613
0.57	71.897	72.182	72.467	72.754	73.041	73.329	73.618	73.908	74.199	74.490
0.58	74.782	75.076	75.366	75.665	75.961	76.257	76.555	76.853	77.153	77.453
0.59	77.754	78.056	78.360	78.664	78.968	79.274	79.580	79.888	80.197	80.506
0.60	80.816	81.128	81.440	81.753	82.067	82.382	82.698	83.015	83.333	83.652
0.61	83.972	84.293	84.614	84.937	85.261	85.586	85.912	86.238	86.567	86.895
0.62	87.225	87.556	87.888	88.220	88.555	88.889	89.225	89.562	89.900	90.239
0.63	90.579	90.920	91.262	91.605	91.949	92.295	92.641	92.989	93.337	93.687
0.64	94.038	94.389	94.742	95.096	95.451	95.808	96.165	96.523	96.883	97.244
0.65	97.605	97.968	98.332	98.697	99.064	99.431	99.800	100.17	100.54	100.91
0.66	101.29	101.66	102.04	102.41	102.79	103.17	103.55	103.93	104.32	104.70
0.67	105.09	105.47	105.86	106.25	106.64	107.03	107.42	107.82	108.21	108.61
0.68	109.01	109.41	109.81	110.21	110.61	111.02	111.42	111.83	112.24	112.65
0.69	113.06	113.47	113.88	114.30	114.71	115.13	115.55	115.97	116.39	116.82
0.70	117.24	117.67	118.10	118.53	118.96	119.39	119.82	120.26	120.70	121.13
0.71	121.57	122.02	122.46	122.91	123.36	123.81	124.27	124.72	125.18	125.64
0.72	126.10	126.57	127.03	127.50	127.97	128.44	128.92	129.40	129.88	130.36
0.73	130.85	131.33	131.82	132.32	132.81	133.31	133.81	134.31	134.82	135.33
0.74	135.84	136.35	136.87	137.39	137.91	138.44	138.97	139.50	140.03	140.57

Values of F_x — Pipe Taps

β	0	1	2	3	4	5	6	7	8	9
0.10	2.079	2.121	2.163	2.206	2.249	2.293	2.337	2.381	2.426	2.471
0.11	2.517	2.563	2.610	2.656	2.704	2.752	2.800	2.849	2.898	2.947
0.12	2.997	3 048	3.099	3.150	3.202	3.254	3.306	3.359	3.413	3.466
0.13	3.521	3.575	3.631	3.686	3.743	3.799	3.856	3.913	3.971	4.029
0.14	4.088	4.147	4.207	4.267	4.327	4.388	4.450	4.512	4.574	4.636
0.15	4.700	4.763	4.828	4.892	4.957	5.022	5.088	5.155	5.222	5.289
0.16	5.357	5.425	5.493	5.562	5.632	5.702	5.773	5.843	5.915	5.987
0.17	6.059	6.132	6.205	6.279	6.353	6.428	6.503	6.578	6.655	6.731
0.18	6.808	6.886	6.964	7.042	7.121	7.200	7.280	7.361	7.441	7.523
0.19	7.605	7.687	7.770	7.853	7.937	8.021	8.106	8.191	8.276	8.363
0.20	8.449	8.536	8.624	8.712	8.801	8.890	8.979	9.070	9.160	9.251
0.21	9.343	9.435	9.528	9.621	9.714	9.809	9.903	9.998	10.094	10 190
0.22	10.287	10.384	10.482	10.580	10.679	10.778	10.878	10.978	11.079	11.180
0.23	11.282	11.384	11.487	11.590	11.694	11.798	11.903	12.009	12.115	12.222
0.24	12.329	12.436	12.544	12.653	12.762	12.872	12.982	13.093	13.204	13.316
0.25	13.429	13.541	13.655	13.769	13.884	13.999	14.114	14.230	14.347	14.464
0.26	14.582	14.701	14.820	14.939	15.059	15.180	15.301	15.422	15.545	15.667
0.27	15.791	15.915	16.039	16.164	16.290	16.416	16.543	16.670	16.798	16.926
0.28	17.055	17.185	17.315	17.446	17.577	17.709	17.842	17.975	18.108	18.243
0.29	18.378	18.513	18.649	18.786	18.923	19.061	19.199	19.338	19.478	19.618
0.30	19.759	19.900	20.042	20.184	20.328	20.472	20.616	20.761	20 907	21.053
0.31	21.200	21.347	21 495	21.644	21.794	21.944	22.094	22 245	22.397	22.550
0.32	22.703	22.857	23.011	23.167	23.322	23.479	23.636	23.793	23.952	24.111
0.33	24.270	24.431	24.592	24.753	24.916	25.079	25.242	25.406	25.571	25.737
0.34	25.903	26.070	26.238	26.406	26.575	26.745	26.915	27.086	27.258	27.431
0.35	27.604	27.778	27.953	28.128	28.304	28.481	28.658	28.836	29.015	29.194
0.36	29.375	29.556	29.738	29.920	30.103	30.287	30.472	30.657	30.843	31.030
0.37	31.217	31.406	31.595	31.785	31.975	32.167	32.359	32.552	32.746	32.940
0.38	33.135	33.331	33.528	33.727	33.924	34.123	34.323	34.523	34.725	34.927
0.39	35.130	35.334	35.539	35.744	35.951	36.158	36.366	36.575	36.784	36.995
0.40	37.206	37.418	37.631	37.845	38.059	38.275	38.491	38.708	38.926	39.145
0.41	39.365	39.585	39.807	40.029	40.252	40.476	40.701	40.927	41.154	41.382
0.42	41.610	41.840	42.070	42.301	42.534	42.767	43.001	43.235	43.471	43.708
0.43	43.946	44.185	44.424	44.664	44.906	45.149	45.392	45.637	45.882	46.129
0.44	46.376	46.624	46.873	47.124	47.375	47.627	47.880	48.135	48.390	48.647
0.45	48.904	49.162	49.422	49.682	49.943	50.206	50.469	50.734	51.000	51.266
0.46	51.534	51.803	52.073	52.344	52.616	52.889	53.163	53.439	53.715	53.993
0.47	54.271	54.551	54.832	55.114	55.397	55.682	55.967	56.254	56.541	56.830
0.48	57.120	57.412	57.704	57.998	58.293	58.589	58.886	59.185	59.486	59.785
0.49	60.087	60.391	60.695	61.001	61.308	61.616	61.926	62.237	62.549	62.862
0.50	63.177	63.493	63.810	64.129	64.448	64.770	65.092	65.416	65.741	66.068
0.51	66.396	66.725	67.056	67.388	67.721	68.056	68.392	68 729	69.068	69.408
0.52	69.750	70.093	70.438	70.784	71.131	71.480	71.831	72.183	72.536	72.891
0.53	73.247	73.605	73.964	74.325	74.688	75.052	75.417	75.785	76.153	76.523
0.54	76.895	77.268	77.643	78.020	78.398	78.778	79.159	79.542	79.926	80.312
0.55	80.698	81.088	81.480	81.874	82.269	82.666	83.063	83.463	83.865	84.268
0.56	84.673	85.080	85.488	85.899	86.311	86.725	87.140	87.558	87.978	88.399
0.57	88.822	89.247	89.678	90.103	90.534	90.966	91.401	91.837	92.275	92.716
0.58	93.158	93.602	94.049	94.497	94.947	95.399	95.853	96.310	96.768	97.229
0.59	97.691	98.156	98.623	99.092	99.562	100.04	100.51	100.99	101.47	101.95
0.60	102.43	102.92	103.41	103.90	104.39	104.89	105.38	105.88	106.39	106.89
0.61	107.40	107.91	108.42	108.93	109.45	109.97	110.49	111.01	111.54	112.06
0.62	112.60	113.13	113.67	114.21	114.75	115.29	115.84	116.38	116.94	117.49
0.63	118.05	118.61	119.17	119.73	120.30	120.87	121.45	122.02	122.60	123.18
0.64	123.77	124.35	124.94	125.53	126.13	126.73	127.33	127.94	128.54	129.15
0.65	129.77	130.38	131.00	131.63	132.25	132.88	133.51	134.15	134.79	135 42
0.66	136.07	136.72	137.37	138.03	138.69	139.35	140.01	140.68	141.35	142.03
0.67	142.71	143.39	144.08	144.77	145.46	146.15	146.85	147.56	148.27	148.98
0.68	149.69	150.41	151.13	151.86	152.59	153.32	154.06	154.80	155.55	156.30
0.69	157.05	157.81	158.57	159.34	160.11	160.88	161.66	162.44	163.23	164.02
0.70	164.82	165.62	166.42	167.23	168.05	168.87	169.69	170.51	171.35	172.18
0.71	173.02	173.87	174.72	175.58	176.44	177.30	178.17	179.05	179.93	180.81
0.72	181.71	182.60	183.50	184.41	185.32	186.24	187 16	188.09	189.02	189.96
0.73	190.90	191.85	192.81	193.77	194.74	195.71	196.69	197 68	198.66	199.66
0.74	200.66	201.67	202.68	203.71	204.73	205.77	206.81	207.85	208.91	209.96

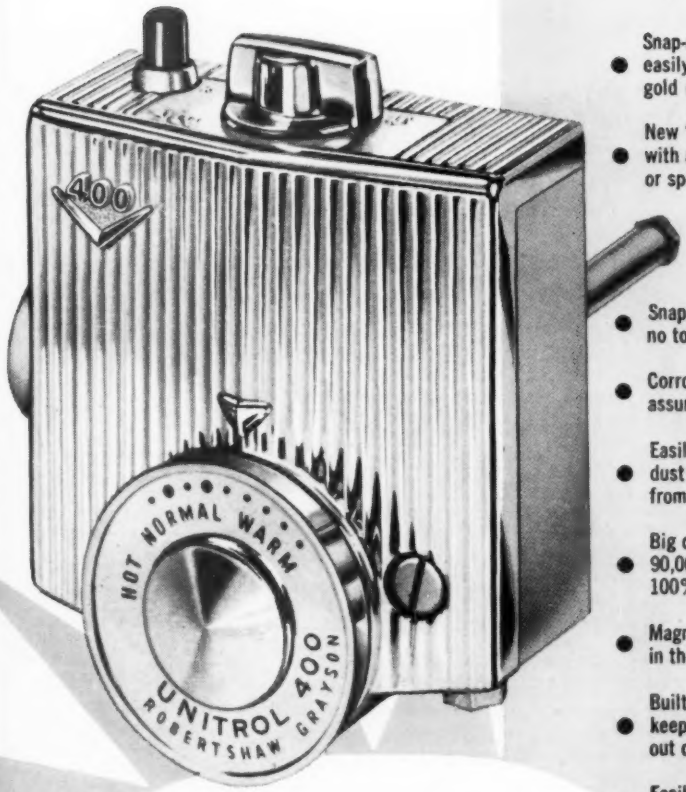
Cut Out and Paste Over Present Table on Page 82 of the 1956 American Gas Journal Handbook Issue

BACKED UP BY MORE THAN TWENTY MILLION CONTROLS

When the Model 400 UNITROL® Gas Water Heater Control was presented to water heater manufacturers it combined the lessons learned in more than 57 years of experience with the know-how gained in the manufacture of more than 20 million units and the knowledge accumulated by watching these controls in action under all gas and water conditions. That's why UNITROL 400 represents the finest water heater control on the market today.

Robertshaw-Grayson thermocouples and pilots belong together — because they are designed to work together.

MODEL 400



- Snap-on gas cock handle easily removed. Supplied in gold or silver.
- New "C" valve adjustable with a coin — no screwdriver or special tools needed.
- Snap-on cover requires no tools for removal.
- Corrosion resistant valve assures positive closure.
- Easily removed gum and dust filter keeps pilot light from clogging.
- Big capacity — delivers up to 90,000 btu's per hour. 100% gas shut-off.
- Magnet assembly easily removed in the field if necessary.
- Built-in dust trap inside control keeps any dust or scale out of working parts of control.
- Easily calibrated and adjusted from the front of the control.

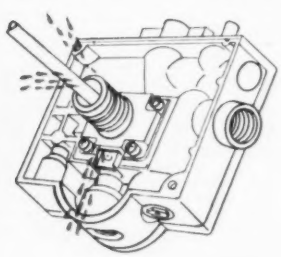
Control Can Be Demounted Without Draining Tank

Robertshaw-Grayson UNITROL®

GAS WATER HEATER CONTROLS

America's most beautiful water heater controls

BY WORLD'S LEADING MANUFACTURER



Air-Gap Construction throughout prevents water entering gas lines.

MR. CONTROLS®

Robertshaw-Fulton CONTROLS COMPANY

Grayson Controls Division, Long Beach, California

Robertshaw-Fulton Controls (Canada) Ltd., Toronto

Robertshaw-Fulton Controls (Australia) Pty. Limited, Burwood, N.S.W.

SELECT THE CONTROLS THAT HELP YOU SELL

TABLE 4

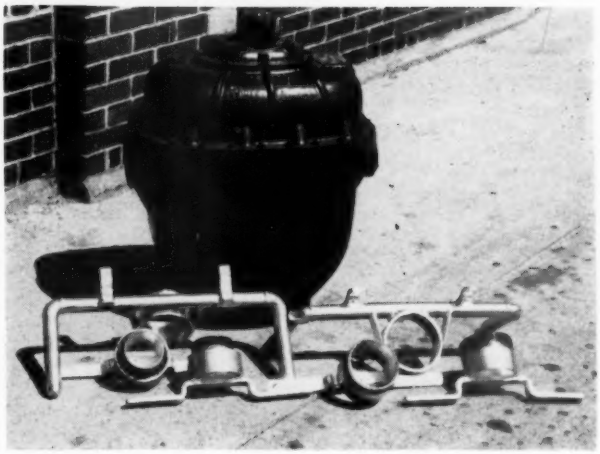
Values of F_1 — Flange Taps

β	0	1	2	3	4	5	6	7	8	9
0.10	206.00	205.97	205.95	205.92	205.90	205.87	205.84	205.82	205.79	205.77
0.11	205.74	205.72	205.70	205.69	205.67	205.65	205.63	205.61	205.60	205.58
0.12	205.56	205.55	205.53	205.52	205.51	205.50	205.48	205.47	205.46	205.44
0.13	205.43	205.42	205.42	205.41	205.41	205.40	205.39	205.39	205.38	205.38
0.14	205.37	205.37	205.37	205.36	205.36	205.36	205.36	205.36	205.35	205.35
0.15	205.35	205.35	205.35	205.35	205.36	205.36	205.36	205.36	205.37	205.37
0.16	205.38	205.38	205.39	205.40	205.40	205.41	205.42	205.42	205.43	205.44
0.17	205.45	205.46	205.47	205.48	205.49	205.50	205.51	205.52	205.53	205.54
0.18	205.56	205.57	205.58	205.60	205.61	205.62	205.64	205.65	205.66	205.68
0.19	205.69	205.71	205.72	205.74	205.75	205.77	205.78	205.80	205.81	205.83
0.20	205.84	205.86	205.88	205.89	205.90	205.92	205.94	205.95	205.97	205.98
0.21	206.00	206.01	206.03	206.04	206.06	206.08	206.09	206.11	206.12	206.14
0.22	206.15	206.17	206.18	206.20	206.22	206.23	206.25	206.26	206.28	206.30
0.23	206.31	206.33	206.34	206.36	206.38	206.39	206.41	206.42	206.44	206.46
0.24	206.47	206.49	206.51	206.52	206.54	206.56	206.57	206.59	206.61	206.63
0.25	206.64	206.66	206.68	206.69	206.71	206.73	206.75	206.76	206.78	206.80
0.26	206.82	206.84	206.85	206.87	206.90	206.91	206.92	206.94	206.96	206.98
0.27	207.00	207.02	207.04	207.05	207.07	207.09	207.11	207.13	207.15	207.17
0.28	207.19	207.21	207.23	207.24	207.26	207.28	207.30	207.32	207.34	207.36
0.29	207.38	207.41	207.43	207.45	207.47	207.49	207.51	207.53	207.55	207.57
0.30	207.59	207.62	207.64	207.66	207.68	207.70	207.72	207.74	207.77	207.79
0.31	207.81	207.83	207.86	207.88	207.90	207.92	207.95	207.97	207.99	208.02
0.32	208.04	208.06	208.09	208.11	208.14	208.16	208.18	208.21	208.23	208.26
0.33	208.28	208.31	208.34	208.36	208.38	208.41	208.44	208.46	208.49	208.51
0.34	208.54	208.57	208.59	208.62	208.65	208.67	208.70	208.73	208.76	208.78
0.35	208.81	208.84	208.87	208.90	208.92	208.95	208.98	209.01	209.04	209.07
0.36	209.10	209.13	209.16	209.19	209.22	209.25	209.28	209.31	209.34	209.37
0.37	209.40	209.44	209.47	209.50	209.53	209.57	209.60	209.63	209.66	209.70
0.38	209.73	209.76	209.80	209.83	209.87	209.90	209.94	209.97	210.00	210.04
0.39	210.08	210.11	210.15	210.18	210.22	210.26	210.29	210.33	210.37	210.40
0.40	210.44	210.48	210.52	210.56	210.59	210.63	210.67	210.71	210.75	210.79
0.41	210.83	210.87	210.91	210.95	210.99	211.04	211.08	211.12	211.16	211.20
0.42	211.24	211.29	211.33	211.37	211.42	211.46	211.50	211.55	211.59	211.64
0.43	211.68	211.73	211.77	211.82	211.86	211.91	211.96	212.00	212.05	212.10
0.44	212.15	212.19	212.24	212.29	212.34	212.39	212.44	212.49	212.54	212.59
0.45	212.64	212.69	212.74	212.79	212.84	212.90	212.95	213.00	213.05	213.11
0.46	213.16	213.22	213.27	213.32	213.38	213.43	213.49	213.54	213.60	213.66
0.47	213.71	213.77	213.83	213.88	213.94	214.00	214.06	214.12	214.18	214.24
0.48	214.30	214.36	214.42	214.48	214.54	214.60	214.67	214.73	214.79	214.85
0.49	214.92	214.98	215.04	215.11	215.17	215.24	215.30	215.37	215.44	215.50
0.50	215.57	215.64	215.70	215.77	215.84	215.91	215.97	216.04	216.11	216.18
0.51	216.25	216.32	216.39	216.46	216.54	216.61	216.68	216.76	216.83	216.90
0.52	216.98	217.05	217.13	217.21	217.28	217.36	217.44	217.51	217.59	217.67
0.53	217.75	217.83	217.91	217.99	218.07	218.15	218.23	218.31	218.39	218.48
0.54	218.56	218.64	218.73	218.81	218.90	218.98	219.07	219.16	219.24	219.33
0.55	219.42	219.51	219.60	219.69	219.78	219.87	219.96	220.05	220.14	220.24
0.56	220.33	220.42	220.52	220.61	220.71	220.80	220.90	221.00	221.09	221.19
0.57	221.29	221.39	221.49	221.59	221.69	221.79	221.89	221.99	222.10	222.20
0.58	222.30	222.41	222.50	222.62	222.72	222.83	222.94	223.04	223.15	223.26
0.59	223.37	223.48	223.59	223.70	223.81	223.92	224.03	224.15	224.26	224.38
0.60	224.49	224.60	224.72	224.84	224.96	225.07	225.19	225.31	225.43	225.55
0.61	225.67	225.79	225.91	226.04	226.16	226.28	226.41	226.53	226.66	226.78
0.62	226.91	227.04	227.17	227.30	227.43	227.56	227.69	227.82	227.95	228.08
0.63	228.22	228.35	228.48	228.62	228.76	228.89	229.03	229.17	229.30	229.44
0.64	229.58	229.72	229.87	230.01	230.15	230.29	230.44	230.58	230.73	230.87
0.65	231.02	231.16	231.31	231.46	231.61	231.76	231.91	232.06	232.21	232.37
0.66	232.52	232.68	232.83	232.99	233.14	233.30	233.46	233.62	233.77	233.94
0.67	234.10	234.26	234.42	234.58	234.74	234.91	235.08	235.24	235.41	235.58
0.68	235.74	235.91	236.08	236.25	236.42	236.60	236.77	236.94	237.12	237.29
0.69	237.47	237.64	237.82	238.00	238.18	238.36	238.54	238.72	238.90	239.08
0.70	239.27	239.45	239.64	239.83	240.02	240.21	240.40	240.59	240.78	240.98
0.71	241.17	241.37	241.57	241.78	241.98	242.19	242.40	242.61	242.82	243.03
0.72	243.25	243.47	243.69	243.91	244.14	244.36	244.59	244.82	245.06	245.30
0.73	245.54	245.78	246.02	246.27	246.52	246.77	247.02	247.28	247.54	247.80
0.74	248.06	248.33	248.60	248.88	249.15	249.43	249.71	250.00	250.28	250.57

Values of F_1 — Pipe Taps

β	0	1	2	3	4	5	6	7	8	9
0.10	207.94	207.94	207.94	207.95	207.96	207.96	207.97	207.98	207.99	208.00
0.11	208.00	208.02	208.03	208.04	208.05	208.06	208.08	208.09	208.11	208.12
0.12	208.14	208.15	208.17	208.19	208.21	208.22	208.24	208.26	208.28	208.31
0.13	208.33	208.35	208.37	208.39	208.42	208.44	208.47	208.49	208.52	208.55
0.14	208.57	208.60	208.63	208.66	208.69	208.72	208.75	208.78	208.81	208.85
0.15	208.88	208.91	208.95	208.98	209.02	209.05	209.09	209.13	209.16	209.20
0.16	209.24	209.28	209.32	209.36	209.40	209.44	209.48	209.52	209.57	209.61
0.17	209.66	209.70	209.75	209.79	209.84	209.88	209.93	209.98	210.03	210.08
0.18	210.13	210.18	210.23	210.28	210.33	210.38	210.44	210.49	210.54	210.60
0.19	210.65	210.71	210.76	210.82	210.88	210.93	210.99	211.05	211.11	211.17
0.20	211.23	211.29	211.35	211.41	211.47	211.54	211.60	211.66	211.73	211.79
0.21	211.86	211.92	211.99	212.06	212.12	212.19	212.26	212.33	212.40	212.47
0.22	212.54	212.61	212.68	212.75	212.82	212.90	212.97	213.04	213.11	213.19
0.23	213.26	213.34	213.41	213.49	213.57	213.64	213.72	213.80	213.88	213.96
0.24	214.04	214.12	214.20	214.28	214.36	214.44	214.52	214.61	214.69	214.77
0.25	214.86	214.94	215.02	215.11	215.20	215.28	215.37	215.45	215.54	215.63
0.26	215.71	215.80	215.89	215.98	216.07	216.16	216.25	216.34	216.43	216.52
0.27	216.61	216.70	216.79	216.89	216.98	217.07	217.16	217.26	217.35	217.45
0.28	217.54	217.64	217.74	217.83	217.93	218.03	218.12	218.22	218.32	218.42
0.29	218.52	218.62	218.72	218.82	218.92	219.03	219.13	219.23	219.33	219.44
0.30	219.54	219.64	219.75	219.85	219.96	220.06	220.17	220.28	220.39	220.49
0.31	220.60	220.71	220.82	220.93	221.04	221.15	221.26	221.37	221.48	221.60
0.32	221.71	221.82	221.94	222.05	222.17	222.28	222.40	222.52	222.63	222.75
0.33	222.87	222.99	223.11	223.23	223.35	223.47	223.59	223.71	223.83	223.95
0.34	224.08	224.20	224.33	224.45	224.58	224.70	224.83	224.95	225.08	225.21
0.35	225.34	225.47	225.60	225.73	225.86	225.99	226.12	226.26	226.39	226.52
0.36	226.66	226.79	226.93	227.06	227.20	227.34	227.47	227.61	227.75	227.89
0.37	228.03	228.17	228.31	228.46	228.60	228.74	228.89	229.03	229.18	229.32
0.38	229.47	229.62	229.76	229.92	230.06	230.21	230.36	230.51	230.66	230.82
0.39	230.97	231.12	231.28	231.43	231.59	231.74	231.90	232.06	232.22	232.38
0.40	232.54	232.70	232.86	233.02	233.18	233.35	233.51	233.68	233.84	234.01
0.41	234.17	234.34	234.51	234.68	234.85	235.02	235.19	235.36	235.54	235.71
0.42	235.89	236.06	236.24	236.41	236.59	236.77	236.95	237.13	237.31	237.49
0.43	237.67	237.86	238.04	238.23	238.41	238.60	238.79	238.98	239.16	239.35
0.44	239.54	239.74	239.93	240.12	240.32	240.51	240.71	240.90	241.10	241.30
0.45	241.50	241.70	241.90	242.10	242.31	242.51	242.72	242.92	243.13	243.34
0.46	243.54	243.76	243.97	244.18	244.39	244.60	244.82	245.03	245.25	245.46
0.47	245.68	245.90	246.12	246.34	246.56	246.79	247.01	247.24	247.46	247.69
0.48	247.92	248.15	248.38	248.61	248.84	249.08	249.31	249.55	249.79	250.02
0.49	250.26	250.50	250.74	250.98	251.22	251.47	251.71	251.96	252.21	252.46
0.50	252.71	252.96	253.21	253.46	253.72	253.98	254.23	254.49	254.75	255.01
0.51	255.27	255.53	255.80	256.06	256.33	256.60	256.86	257.13	257.40	257.68
0.52	257.95	258.23	258.50	258.78	259.06	259.34	259.62	259.90	260.19	260.47
0.53	260.76	261.05	261.34	261.63	261.92	262.21	262.51	262.80	263.10	263.40
0.54	263.70	264.00	264.30	264.61	264.92	265.22	265.53	265.84	266.15	266.46
0.55	266.77	267.09	267.41	267.73	268.05	268.37	268.70	269.02	269.35	269.67
0.56	270.00	270.33	270.67	271.00	271.34	271.67	272.01	272.35	272.69	273.04
0.57	273.38	273.73	274.09	274.43	274.78	275.13	275.49	275.85	276.20	276.56
0.58	276.93	277.29	277.66	278.02	278.39	278.76	279.13	279.51	279.88	280.26
0.59	280.64	281.02	281.41	281.79	282.18	282.56	282.96	283.35	283.74	284.14
0.60	284.54	284.94	285.34	285.75	286.15	286.56	286.96	287.38	287.79	288.21
0.61	288.62	289.04	289.47	289.89	290.32	290.74	291.17	291.60	292.04	292.48
0.62	292.92	293.36	293.80	294.24	294.69	295.14	295.59	296.05	296.50	296.96
0.63	297.42	297.89	298.35	298.82	299.29	299.76	300.24	300.71	301.19	301.68
0.64	302.16	302.65	303.14	303.63	304.12	304.62	305.12	305.62	306.12	306.63
0.65	307.14	307.65	308.17	308.69	309.21	309.73	310.25	310.78	311.31	311.83
0.66	312.38	312.92	313.47	314.01	314.56	315.11	315.66	316.22	316.78	317.34
0.67	317.91	318.48	319.05	319.62	320.20	320.78	321.36	321.95	322.54	323.13
0.68	323.73	324.33	324.93	325.54	326.15	326.76	327.37	327.99	328.62	329.24
0.69	329.87	330.51	331.14	331.78	332.43	333.07	333.73	334.38	335.04	335.70
0.70	336.37	337.04	337.71	338.39	339.07	339.75	340.44	341.13	341.83	342.53
0.71	343.24	343.94	344.66	345.37	346.10	346.82	347.55	348.28	349.02	349.76
0.72	350.51	351.26	352.02	352.78	353.54	354.31	355.09	355.87	356.65	357.44
0.73	358.23	359.03	359.83	360.64	361.45	362.27	363.10	363.93	364.75	365.59
0.74	366.44	367.28	368.14	369.00	369.86	370.73	371.61	372.49	373.38	374.27

Cut Out and Paste Over Present Table on Page 83 of the 1956 American Gas Journal Handbook Issue



Meter handles are simple, compact construction.

Handles mounted, meter ready to be carried easily and safely by two men.

Handle Ironcase Meters Safely

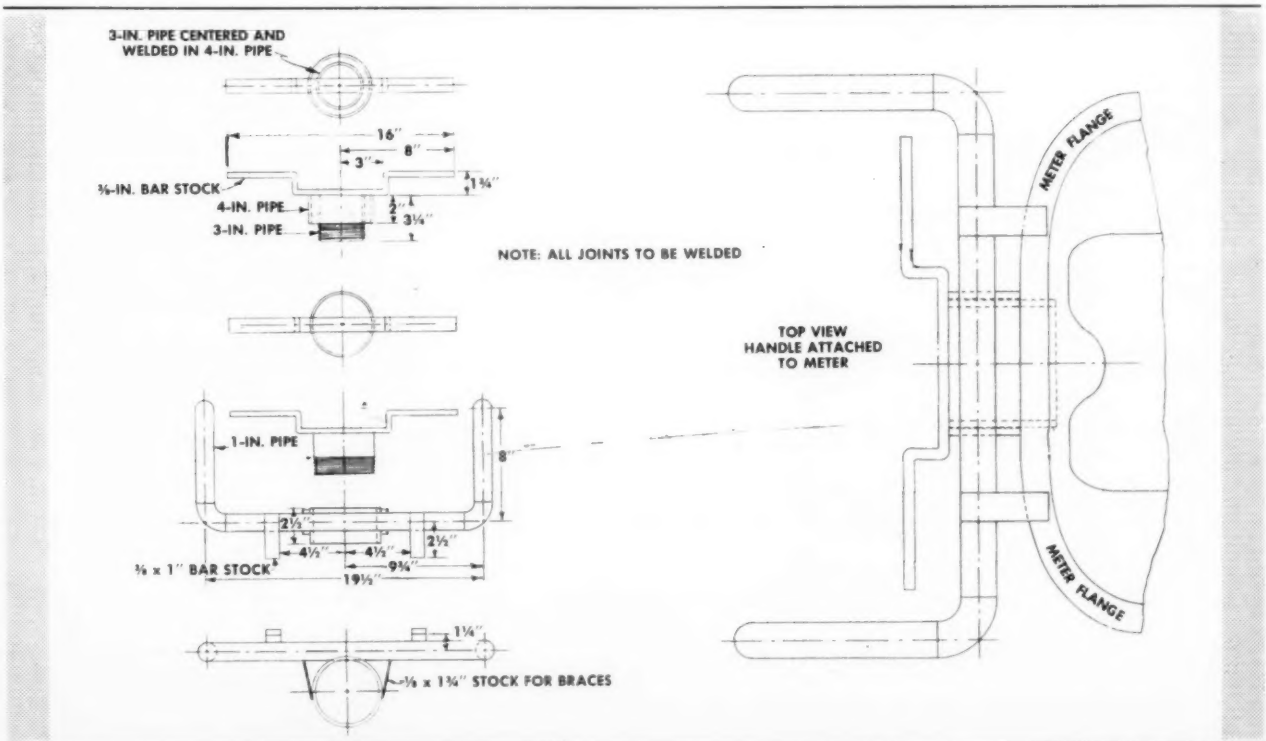
Here's a handy equipment item that can be constructed in your company shops that will make handling of large — and heavy — meters safer and easier. There are three pieces of equipment — a carrying handle that provides a convenient and safe way to maneuver the large meters, a dolly, and a track to solve the problem of moving them in and out of trucks.

The meter handles are of simple, compact construction, and when mounted on the meter make it possible to be carried easily by two men. The handles, of welded construction, can be made for any make and size of meter.

The dolly makes it possible to place and remove the meters on service trucks. The dolly is made of ¾-in., ½-in. and ⅜-in. pipe, ⅜-in. rod, ¼-in. deck plate, and has pneumatic tires.

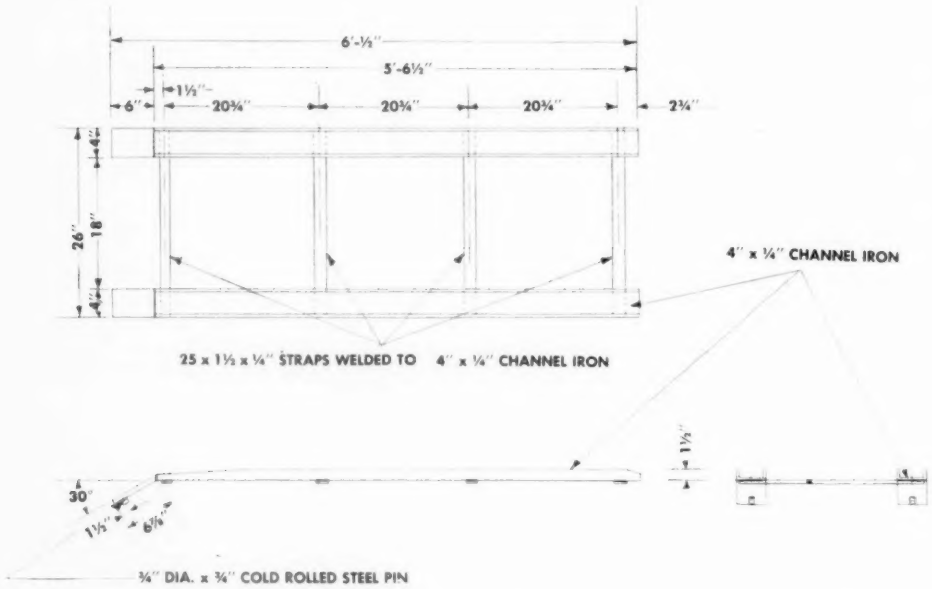
The dolly tracks are constructed from 4 by ½-in. channel iron and 1½ by ¼-in. straps, welded construction.

The accompanying photos and drawings illustrate use and construction of the equipment, which was suggested by W. N. McClelland, storage supervisor, Consumers Power Company, Jackson, Michigan, to the Material Handling Subcommittee of the Purchasing and Stores Committee, American Gas Association. It has been issued by the subcommittee as Material Handling Item Number 41.



Method of removing meter from truck.

Dolly can easily be handled by one man when on the ground.



Glossary of Gas Industry Terms–Or to Re

Organic Sulfur: Sulfur in compounds, other than hydrogen sulfide, that are found in manufactured gas.

Orifice: Relatively small hole, generally round, in a plate, pipe or hollow body, designed to permit the controlled flow of a fluid.

Orifice Meter: Meter for measuring flow of fluid through a pipe or duct by measurement of the pressure differential across a plate having a precisely cut hole in its center.

Orsat Analyzer: Apparatus used to measure the quantitative amounts of carbon dioxide (CO_2), oxygen (O) and carbon monoxide (CO) in a gas.

Orsat Apparatus: A portable device for the analysis of gases.

Otto Cycle: The four-stroke cycle of the modern gas and gasoline engine proposed by Dr. Otto, a German scientist. Suction stroke; compression stroke; ignition; working stroke and expansion; expulsion or scavenging stroke for the rejection of burnt gas.

Outage: The difference between the full and rated capacity and the actual contents of a barrel, tank, or tank car.

Output: Quantity or volume of production or delivery in a given time interval.

Overall Boiler Efficiency: Ratio of useful heat in the steam produced to the gross heat content of the fuel fed to the boiler.

Overflow Pipe: A pipe near the top of a storage tank through which the excess of fluid passes out. A pipe or orifice used to limit the height of fluid in a vessel.

Overhead Products: All products that are taken off from an oil still in a vapor form.

Overload: Any load on a machine or system that is in excess of its rated capacity.

Oxide: Chemical combination of an element or material with oxygen.

Oxide Activity: Indication of effectiveness of an iron oxide purifying material in removing hydrogen sulfide from gas.

Oxidize: To combine with oxygen by direct contact with oxygen or with an oxidizing agent.

Oxidizing Atmosphere: Gases in a metallurgical furnace that cause scale or oxidize the metal being heat treated.

Oxygen, O: A gaseous element occurring free in the atmosphere, of which it forms about 21 per cent. It is chemically very active and supports combustion, the combination of the oxygen with other substances generally producing heat. It is the basic factor in combustion, and in combining with the fuel to produce heat, forms several byproducts, among which is water vapor.

P

Packing: Material used to seal a joint, such as in bell and spigot pipe, or to seal a gland through which a rotating shaft passes.

Panel Heater: Heating unit mounted on or flush with a wall surface.

Panel Heating: Transmission of heat by both convection and radiation from panel surfaces to surrounding air.

Paraffin: White waxy, odorless, tasteless substance obtained from petroleum and other oils.

Paraffin Base: Designation of crude oil composed largely of paraffin series of hydrocarbons.

Paraffin Series of Hydrocarbons: Hydrocarbons having all the carbon valence bonds taken up with hydrogen and having straight or branched chain molecular structure; characterized by "ane" ending of name, such as methane, ethane, propane and butane.

Pascal's Law: A pressure exerted on a confined liquid is transmitted in all directions throughout the liquid.

Paving Breaker: Pneumatically operated hammer with a heavy chisel point used to break street paving or concrete.

Pay or Pay Sand: The part of a gas- or oil-bearing stratum from which production can be obtained in commercial volumes.

Peak or Peak Load: The maximum consumer-demand for gas on a system during a specified interval; hour, day, week, month or year.

Peak Shaving: Supplying gas to a system from an auxiliary source, during periods of maximum demand, to reduce the load or demand on the primary source of supply.

Pease's Electric Tester: An instrument in which the vapor of petroleum is ignited by an electric spark passing above the oil cup, which rests in a water bath.

Peat: The earliest stage in the formation of coal; soft brown coal.

Pentane: Fifth member of the paraffin or saturated hydrocarbon series (C_5H_{12}). Boiling point, 97 F.

Per Cent Air: Percentage of the theoretical air required for complete combustion that is actually supplied to the combustion chamber.

Per Cent Excess Air: Volume of air supplied for combustion over and above that needed for complete combustion, expressed as a per cent.

Perfect Combustion: Supplying fuel and air to a combustion chamber in such proportions that both the fuel and oxygen are totally consumed.

Perfect Gas: Any gas that conforms to Boyle's Law under wide variation of conditions, such as a gas in which the product of the absolute pressure, P, times the specific volume, v, divided by the absolute temperature, T, equals a constant, R. $\frac{Pv}{T} = R$

Perkins Joint: A joint consisting of threaded pipe and coupling, both threaded straight (no taper). The one end of the pipe is left square and the other is beveled to a knife edge at mid-thickness. Used in Baku oil fields.

Permeability: Ability of a substance, such as rock or shale, to allow the passage of fluids through pores or voids.

Persorption: The absorption of a gas by a solid in an extremely effective manner, with the formation of a very intimate mixture of the two substances.

Petroleum: A natural oil, composed primarily of hydrocarbons, existing in the earth's crust and produced by drilling wells into the deposits or extracting from oil bearing shales at or near the earth's surface.

Petroleum Asphalt: Asphalt obtained from refining of petroleum; used widely in highway construction.

Petroleum Coke: Solid, carbonaceous residue of petroleum distillation.

pH Number: A numerical designation of the degree of alkalinity or acidity of a substance. A pH number of 7 denotes neutrality, numbers greater than 7 denote increasing alkalinity, numbers decreasing from 7 denote increasing acidity.

Phosphene: An inflammable and evil smelling gas (poisonous) formed by the direct combination of phosphorous and hydrogen gas.

Photocell Flame Detector: A device in which the light of a flame, shining on a photoelectric cell, generates an electric current that may activate such protective equipment as alarm systems, fuel shut-off valves, sprinkler or CO_2 fire systems.

Pig: Cleaning device that is sent through a pipe line to scrape and brush foreign deposits, rust and dirt from the inside surface of the pipe; also called a go-devil.

Pilot Light or Flame: Constantly-burning small flame that ignites a large burner or burner system as gas enters.

Pipe: A tubular product made as a production item for sale as such. Cylinders formed from plate in the course of the fabrication of auxiliary equipment are not pipe as defined here.

Pipe Burner: Pipe, with a line of holes drilled along length, that acts as a mixing chamber for the primary air and gas before the mixture passes through the holes for combustion.

Pipe Coating: Covering that is often an asphaltic preservative with an outer wrapping that is put on iron or steel pipe to protect it and prevent corrosion.

Pipe Container: A gas-tight structure assembled in a shop or in the field from pipe and end closures.

Pipe Covering: Insulating jackets placed around piping to prevent the transfer of heat or cold into or out of the pipe.

Pipe, Iron Size: Pipe conforming to iron pipe standards but made of other material.

Pipeless Furnace: Type of house-heating warm air furnace in which heated air comes through a grating directly into a central room instead of being piped to individual rooms by ducts.

Pipe Line: Continuous pipe conduit, complete with such equipment as pumping or compressor stations, tanks, communication system and valves, for transporting fluids from one point to another, usually from the source of supply to points of utilization.

Pipe Liner: An employee of a pipe line company or a pipe line construction company.

Pipe Line Walker: An employee who walks along a pipe line checking its condition for leaks or breaks; now largely obsolete, with the work being done primarily from airplanes.

Pipe Nipple: A very short length of pipe.

Pipe Prover: An apparatus for testing the tightness of a pipe line or system, usually by hydraulic pressure.

Pipe Riser: A vertical run of pipe.

Pipe Tongs: A hand tool for gripping or rotating pipe.

Pipe-Type Holder: Any pipe-container or group of inter-connected pipe-containers installed at one location, and used for the sole purpose of storing gas.

Piston: Reciprocating plug or block fitting within the cylinder of a reciprocating engine, compressor or pump. Also, the movable section of a waterless gas holder.

Pit Holder: Water-sealed gas holder having its water tank below ground.

Pitch: Heavy, sticky, black mixture of hydrocarbons.

Pitch, Pipe: The slope given to a pipe for drainage of the water.

Pitot Tube: Two small, contiguous tubes that can be inserted into a pipe carrying fluids to measure the flow of fluid in the pipe. The tubes are so arranged that one is affected by the flowing pressure of the fluid and the other by the static pressure existing in the pipe. The outside ends of the tubes are connected to either side of a manometer tube and the difference in pressure so measured is related directly to the rate of fluid flow in the pipe.

Pitting: Formation of small depressions in a surface due to sand blasting, mechanical gouging, acid etchings or corrosion.

Plant: General term for the land, buildings, machinery and equipment engaged in a manufacturing operation.

Plenum Chamber: Gas or air chamber under pressure and connected with one or more distributing ducts.

Plug: Sealing a hole in a vessel, such as a pipe or tank, by inserting material in the hole and then securing it by forcing or threading it in. Also, refers to the material used to plug the hole. Threaded pipe fitting that is screwed into the open end of a coupling to seal the end of a pipe also is called a plug.

Plug Cock: See: Lubricated Plug Cock.

Pneumatic Tools: Tools that are compressed air-operated, such as drills, hammers, tampers, and chippers.

Poise: Metric measurement of absolute viscosity equal to one dyne second per square centimeter, or one gram per centimeter second.

Porosity: Usually expressed as a percentage, the voids in oil- or gas-bearing rocks and shales.

Port: Opening in the seat of a slide valve in diaphragm gas meters, or an opening in any equipment for the flow of gases or vapors.

Ported Manifold-Type Burner: Burner in which the fuel-air mixture burns at a number of small openings such as in domestic gas range burners.

Positive Displacement Pump: Pump that delivers a constant volume of fluid per cycle of operation at whatever pressure is necessary within the design limits of the mechanism of the pump.

Potential Energy: Available but unreleased or unused energy.

Pound Per Square Inch: Unit of pressure equivalent to one pound of weight distributed evenly throughout, but contained entirely within one square inch of horizontal surface, (Psi).

Pour Point: Temperature at which a liquid, such as oil, ceases to flow.

Powdered Fuel Burner: Burner that utilizes mechanically fed pulverized solid fuel.

Power: Rate of application of force.

Precipitator: Mechanical, electrostatic, or chemical device to remove fine ash, tars, dusts or smoke particles from flue gases or other gaseous streams.

Preheat: Advance heating, such as heating the combustion air of a furnace before it reaches the burner.

Premix Burner: Burner in which fuel and primary air are mixed before reaching the nozzle, or a burner to which is fed a mixture of fuel and air.

Premixer: Mechanical device for mixing fuel and air in the proper proportions for combustion before feeding into a burner or burner system.

Preparation Period: Preliminary heating period in water gas production in which the fuel bed is heated to incandescence.

Prepayment Meter: Coin-operated gas meter from which a specific volume of gas is supplied as required after a coin of the designated value has been deposited.

Pressure: Unless otherwise stated is expressed in pounds per square inch above atmospheric pressure, i.e., gage pressure (Psig).

Pressure Control: Manual or automatic maintenance of pressure, in all or part of a system, at a predetermined level, or within a selected range.

Pressure Differential: Difference in pressure between any two points in a continuous system. Also, called pressure drop.

Pressure Gage: Instrument for measuring the pressure of a fluid.

Pressure Holder: High-pressure storage tank for a compressible fluid.

Pressure Limiting Stations: Consists of equipment installed for the purpose of preventing the pressure on a pipe line or distribution system from exceeding the maximum allowable operating pressure, by controlling or restricting the flow of gas when abnormal conditions develop.

Pressure Loader: Device in which the rate of gas flow controls the operation of a pressure governor.

Pressure Loss: Lowering of pressure in equipment or piping system.

Pressure Regulating Station: Consists of equipment installed for the purpose of automatically reducing and regulating the pressure in the downstream pipe line or main to which it is connected. Included are piping auxiliary devices such as valves, control instruments, control lines, the enclosures and ventilating equipment.

Pressure Regulator: Device that maintains a constant pressure in a fluid flow line, less than its inlet pressure, regardless of the rate of flow in the line.

Pressure Relief Station: Consists of equipment installed for the purpose of preventing the pressure on a pipe line or distribution system to which it is connected from exceeding by more than an established increment the maximum allowable operating pressure, by venting gas to the atmosphere whenever the pressure tends to rise too high.

Pressure Survey: An investigation of gas pressures in various parts of a distribution system to insure that the pressure is adequate in all parts of the system for proper gas service.

Preventive Maintenance: Routine maintenance, repair and replacement of worn or defective parts in a plant before failure in service to prevent operating shut-downs.

Primary Air: Air that is mixed with fuel for required combustion characteristics before it is fed to the combustion chamber.

Primary Condenser: First condenser through which a gas or vapor passes for cooking or removal of impurities.

Priming: Foaming and frothing of the water in a boiler; also the filling of pumps and adjacent lines with fluid before starting the pumps to insure development of suction.

Private Rights of Way: As used in the ASA code are rights of way that are not located on roads, streets or highways used by the public, or on railroad rights of way.

Producer and Producer Gas: Machinery and equipment for burning or combustion of coal or coke with an insufficient supply of air to form producer gas that consists largely of carbon monoxide.

Product Period: Period in water gas production in which steam is blown over the incandescent fuel bed to produce water or blue gas.

Products of Combustion: Flue gases, ash and vaporized liquids resulting from the burning of a fuel and air.

Propane: Gaseous member of the paraffin series of hydrocarbons (C_3H_8), that when liquefied under pressure, is one of the components of liquefied petroleum (LP) gas.

Proportional Control: Control system in which the value of the controlled variable maintains a continuous linear relationship to the setting of the controlling medium.

Proportioning: Maintaining the selected ratio between fuel and air in the flow to combustion equipment.

Proprietary Items: Items made and marketed by a company having the exclusive right to manufacture and sell them.

Prove and Prover: Prover is a device for measuring the accuracy of a gas meter as a basis for adjusting to the desired accuracy limits.

Psi: Abbreviation for pounds per square inch.

Psig: Abbreviation for pounds per square inch gage.

Psychrometer: Instrument for measuring atmospheric humidity.

Puddling: Adding water to a material and working it into a mud consistency to compact the material.

Purge: To thoroughly clean a pipe line or piece of equipment so that all the material it contained is removed.

Purge Pipe: An extra draft stack on a coal-fueled water gas set through which gases escape when coal is charged into the generator.

Purification: The process by which unwanted impurities are removed from a material.

Purifier: Equipment used in the process of purification.

Purifier Box: A type of purifier in which hydrogen sulfide is removed from manufactured gas by passing the gas through a mixture of wood shavings and iron oxide.

Purifier Box Rotation: The passing of gas through alternate purifier boxes in a group according to a set sequence.

Purifying Material: The material used to remove impurities, such as the iron oxide and wood shavings used to remove hydrogen sulfide from manufactured gas.

Pusher: Mechanical ram that pushes coke out of a coke oven or coal gas retort.

Pusher End: The end of a coke oven or coal gas retort at which the pusher enters.

Pyrometer: High-temperature measuring instrument.

Q

Quarter Bend: In pipe work, a bend of 90 deg connecting two lines running at right angles to each other.

Quench: Rapid cooling of heated material, with water, oil or air.

Quenching Tower: An elevated water tank under which cars of hot coke can pass and have water sprayed on them to cool the coke.

Quicksilver: The metallic element mercury.

R

Rack Pipe: To stand drill pipe on the drilling derrick floor or to stack pipe on a horizontal rack.

Radiant: A unit of a burner, generally made of ceramic material that, when heated by gas, glows from dull red-to-white and radiates heat.

Radiant Section: That portion of the liquid-carrying tubes in a boiler, tube-still, or heating furnace, that are exposed to the radiation from the flame and hence are primarily heated by radiation.

Radiation: Heat transmission through waves unaffected by the medium through which they pass.

Radiation Pyrometer. A temperature-measuring device for recording very high temperatures by focusing the radiation of the heated area through a telescope upon a thermocouple. The electric current generated in the thermocouple is read on a dial calibrated to read in degrees the temperature of the heated area.

Ram: See: Pusher.

Random Length: Lengths of material, generally pipe in the gas industry, that differ from standard. If pipe is bought in random 20 ft lengths, individual pieces may vary from 18 ft to 22 ft.

Raschig Rings: Cylindrical rings with the length equal to the diameter and with as thin a wall as possible. Used as a packing in gas absorption towers.

Rated Horsepower: The developed horsepower of an engine when operated under conditions specified by the manufacturer.

Rate of Flame Propagation: The speed of flame-travel in an inflammable

gaseous mixture of fuel and air. Usually expressed in centimeters per second or feet per second.

Rate of Flow: The volume or units of a material passing a given point in a system per unit of time.

Ratio: The relation between two quantities of the same kind, expressed as the fraction one quantity is of the other.

Raw Materials: The basic substances from which usable products are produced.

Raw Natural Gas: Natural gas as it comes from the ground before it is processed or cleaned.

Reaction: The chemical combination of two or more elements or compounds to form a new compound. Physically, the resultant effect of the application of force or energy upon an object or material.

Reactivity of Coke: A measure of the ease with which a particular coke will enter into the water or blue gas reaction.

Reagent: Any material that causes a chemical reaction when added to a second substance.

Ream: To scrape or abrade a pipe, tube or round opening to the required size.

Reciprocal Compressor: One in which compression is achieved by a piston moving back-and-forth in a cylinder.

Reciprocating Engine: One that transmits power by means of a back-and-forth motion.

Recording Gage: A gage equipped to make a continuous chart record of the value of the variable being measured.

Recovery Gas-Oil Ratio: A number of cubic feet of gas produced from the reservoir per barrel of oil.

Rectification: Conversion of an alternating electric current into a pulsating direct current.

Recuperator, Recuperation: A heat exchanger designed to heat incoming air stream to a coal gas plant with the stream of hot flue gases from the plant without mixing of the two streams.

Recycling: The return of a portion of the material of a process to an earlier stage for reprocessing. In oil production practice, all or a part of the natural gas produced with the oil is returned to the production strata to maintain the reservoir pressure and increase the ultimate oil recovery.

Reducer: A pipe fitting that is larger at one end than the other — used to connect two different sizes of pipe.

Reducing Atmosphere: A gaseous environment that tends to deoxidize materials with which it comes in contact. Used in certain metal heat treating operations to prevent oxidation of the metallic surfaces and to remove any oxides that are present.

Reducing Taper Elbow: A reducing elbow that uniformly decreases in diameter as it curves toward the small end; used to connect two different sizes of pipe.

Reducing Tee: A T-shaped pipe fitting having two different sized openings. The reduction may be either on the run or the branch of the tee.

Reducing Valve: A lever or spring-loaded valve that maintains a constant lower pressure on the downstream side of the valve.

Reel Oven: A large insulated sheet metal cylinder containing a revolving cake upon which trays, containing material to be baked, are hung. Near the bottom a loading door is provided for loading and unloading the trays. Heated air or flue gas is passed through the oven.

Reference Gage: An accurately-calibrated gage used solely for the verification of the accuracy of gages in actual measurement use.

Refine: Separate and purify into component parts or distinct fractions.

Refinery: A crude oil purification and separation plant.

Refinery Oil Gas: A hydrocarbon gas obtained as a by-product in the refining of petroleum, particularly from the operation of cracking stills for the production of gasoline. Composed mainly of volatile hydrocarbons and hydrogen, and has a heating value between 1300 and 1800 Btu per cubic foot.

Reforming: The process of thermal or catalytic cracking of natural gas, liquefied petroleum gas or refinery oil gas, resulting in the production of a gas having a different chemical composition.

Refractory Cement: Cement that is resistant to high temperature and used for joining refractory bricks and for refractory linings of furnaces and ovens.

Refractory Material: Substances that will not decompose under very high temperatures; used for lining furnaces and ovens.

Refrigerant: A vapor that can be condensed at atmospheric temperature under readily-obtainable pressure and will then evaporate at a suitable temperature and under a lower pressure.

Refrigeration Cycle: The full sequence of condensation and evaporation. The heat of evaporation is obtained from the material to be cooled.

Refrigerating Capacity: The amount of heat removed by a refrigerating system during a specified period of time, expressed in Btu per hour.

Refrigeration Ton: 200 Btu per minute of heat removal.

Regenerator: A unit of coke oven plant containing two sections, each containing brick checker-work. Hot flue gases are passed alternately through the sections to heat the brick, after which the air to burn the producer gas is passed over the brick to preheat the air.

Register, Registration: The meter-dial positions of a gas meter index is the registration. The difference between two successive registrations indicates the volume of gas that has passed through the meter.

Regulating Valve: See: Valve.

Regulator: See: Pressure Regulator and Governor.

Relative Gas Density: Ratio of the weight of a given volume of a gas to the weight of an equal volume of hydrogen under the same physical conditions.

Relative Humidity: The ratio of the volume of water vapor in the atmosphere to the volume the air would hold if completely saturated at that temperature. Usually expressed as a percentage.

Relief Holder: See: Gas holder.

Relief Valve: A valve designed to quickly reduce the pressure-differential across it when such differential exceeds the predetermined maximum. May be used for either pressure or vacuum relief.

Repressuring: Increasing crude oil production by forcing gas produced with the oil, under pressure, back into the oil sands; also done with water. See: Recycling.

Reserve Storage: A supply of essential material accumulated from normal supplies for use when the normal supply is interrupted.

Reservoir: A structural arrangement of rock strata that forms a trap for the accumulation of oil and gas.

Reservoir Energy: The amount of energy available in a gas or oil reservoir for producing the gas or oil by natural flow.

Reservoir Gas-Oil Ratio: The number of cubic feet of gas per barrel of oil originally in the reservoir. See: Gas-oil ratio.

Reservoir Pressure: The pressure existing at the level of the oil pool when the well is shut-in and not flowing; the pressure at the wellhead plus the pressure of the column of liquid standing in the well, when the well is shut-in.

Part 9 of Gas Fundamentals will appear in the next issue.

CALENDAR OF THE GAS UTILITY INDUSTRY

January

17-24 National Housewares and Home Appliance Manufacturers Exhibit, Chicago, Illinois.

18 Oklahoma Utilities Association, accounting section.

18 SGA employee relations round-table conference, Statler Hilton Hotel, Dallas, Texas.

20-24 National Association of Home Builders, Chicago, Illinois, (AGA will exhibit).

23 NEGA operating division, Hotel Statler, Boston, Massachusetts.

24 American Marketing Association, seminar on public utilities marketing, Dallas, Texas.

25 Pennsylvania Gas Association, mid-winter sales conference, Benjamin Franklin Hotel, Philadelphia, Pennsylvania.

25 SGA accident prevention round-table conference, Tutwiler Hotel, Birmingham, Alabama.

28-29 Industrial Heating Equipment Association, Washington, D. C.

31-February 1 Southern California Meter Association, Sixth Annual Instrument Short Course, Los Angeles Junior College, Wilmington, California.

February

3- 5 Public Utility Buyers' Group, National Association of Purchasing Agents, The Brown Hotel, Louisville, Kentucky.

4- 6 AGA Home Service Workshop, King Edward-Sheraton Hotel, Toronto, Ontario, Canada.

4- 8 Western winter radio-television and appliance market, Western Merchandise Mart, San Francisco.

25-28 American Society of Heating and Air Conditioning Engineers, annual meeting and exposition, Chicago, Illinois.

March

11-14 National Electrical Manufacturers Association, Edgewater Beach Hotel, Chicago, Illinois.

11-15 National Association of Corrosion Engineers, Kiel Auditorium, St. Louis, Missouri.

21-22 NEGA, annual meeting, Hotel Statler, Boston, Massachusetts.

25-27 Mid-West Gas Association, Hotel Nicollet, Minneapolis, Minnesota.

25-27 AGA general management section, Edgewater Gulf Hotel, Edgewater Park, Mississippi.

28-29 Oklahoma Utilities Association, annual convention, Tulsa Hotel, Tulsa, Oklahoma.

April

2- 4 University of Oklahoma Corrosion Control Short Course, Extension Study Center, Norman, Oklahoma.

8-10 National conference of electric and gas utility accountants, Sheraton-Park Hotel, Washington, D. C.

8-10 GAMA annual meeting, The Greenbrier, White Sulphur Springs, West Virginia.

8-11 AGA distribution, motor vehicles and corrosion conference, Rice Hotel, Houston, Texas.

14-17 American Home Laundry Manufacturers Association, annual convention, French Lick, Indiana.

16-18 AGA sales conference on industrial and commercial gas, Jung Hotel, New Orleans, Louisiana.

16-18 University of Oklahoma Gas Measurement Short Course, Norman, Oklahoma.

25-26 Indiana Gas Association, annual meeting, French Lick-Sheraton Hotel, French Lick, Indiana.

29-May 1 Southern Gas Association, New Orleans, Louisiana.

May

6- 7 AGA residential gas section, eastern sales conference, William Penn Hotel, Pittsburgh, Pa.

6- 8 Air Conditioning and Refrigeration Institute, annual meeting, The Homestead, Hot Springs, Virginia.

6-10 National Restaurant Association convention and exposition, Navy Pier, Chicago (AGA will exhibit).

7- 9 AGA research & utilization conference, Cleveland, Ohio.

8-10 Joint AGA-PCGA gas supply, transmission and storage conference, Mark Hopkins Hotel, San Francisco.

12-15 LPGA annual meeting, Conrad Hilton Hotel, Chicago, Ill.

19-22 Industrial Heating Equipment Association, Hot Springs, Virginia.

20-22 AGA mid-west regional gas sales conference, Edgewater Beach Hotel, Chicago, Illinois.

20-22 AGA chemical, engineering and manufactured gas production conference, Balmoral Hotel, Bal Harbour, Florida.

20-24 National Fire Protection Association, Hotel Statler, Los Angeles.

21-22 AGA industrial and commercial gas section, managing committee, Sea Island, Georgia.

21-23 Pennsylvania Gas Association, annual meeting, Pocono Manor Inn, Pocono Manor, Pennsylvania.

June

2- 5 American Gear Manufacturers Association, annual meeting, The Homestead, Hot Springs, Virginia.

2- 5 The American Society for Refrigerating Engineers, Hotel Fontainebleau, Miami Beach, Florida.

3- 5 American Management Association, general management conference, Statler Hotel, New York.

3- 5 Institute of Appliance Manufacturers, Netherland-Hilton Hotel, Cincinnati, Ohio.

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COMPRESSED AIR—A Versatile Tool

Pushing, pulling, turning, lifting, tilting, and as a source of portable power, this valuable ally has proven itself in helping Southern California Gas Company expand its operations to serve its growing market area

THE area served by Southern California Gas Company keeps growing bigger. The little towns that surrounded the core of the company in Los Angeles five or six years ago have become big cities. The core itself keeps growing.

This may be a matter of Chamber of Commerce pride, but for the gas utility company, it is a big problem challenging every resource for a solution.

In looking for examples of how this problem is being met without excessive capital outlay and without delay, a good one can be found in the way that compressed air, an old and reliable ally of the gas industry, is being put to work. In many instances the company has gone beyond the conventional uses.

The principal uses for this type of power are found in the pipe yard, the meter shop, at the eight gas holder stations, and, of course, in the field where only compressed air is the kind of portable power required.

Air Speeds Pipe Coating

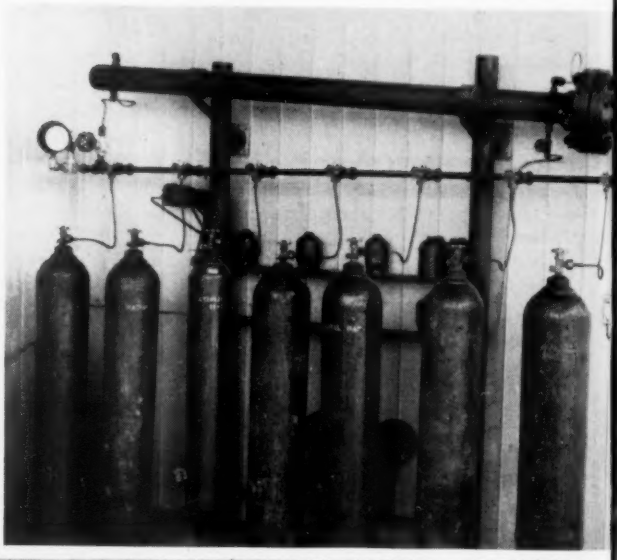
Some operations in the pipe yard have increased output by 50 per cent while reducing manpower by 40 per cent through adoption of automatic processes for pipe wrapping. Automatic operations have made the Southern California Gas Company's yard one of the most modern in the United States.

While space does not permit the many pages of drawings and words necessary to fully detail the workings of the yard, some of the basic principles are mentioned to suggest what can be done when two, three and four-way valves, micro-switches, limit switches, and other devices are coupled with compressed air cylinders to automatically move pipe through the wrapping processes.

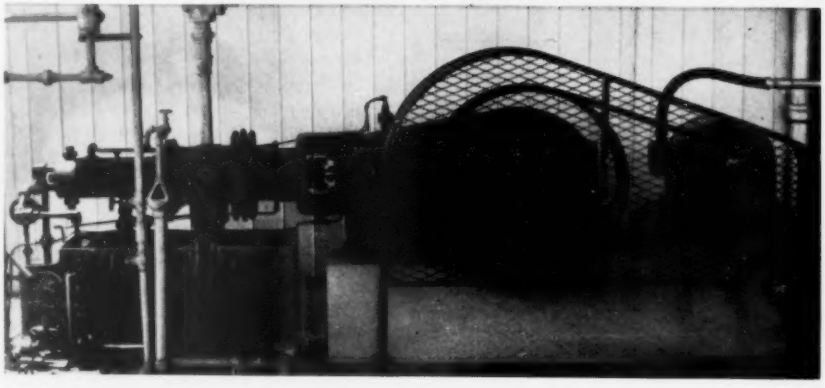
On one wrapping line, for instance, after a fork truck has loaded a slanting roller table with pipe, compressed air takes the pipe off the table, pushes it into the oven, carries it on to sandblasting, and then to the wrapping process. Here, too, compressed air performs a variety of tasks such as automatically lifting a roller painter to paint both ends of pipe, kicking the pipe off one track while another ram puts the pipe on the other track for a return to complete the wrapping cycle.

In this connection, compressed air-actuated devices automatically clamp,

Photos and data courtesy of Compressed Air and Gas Institute

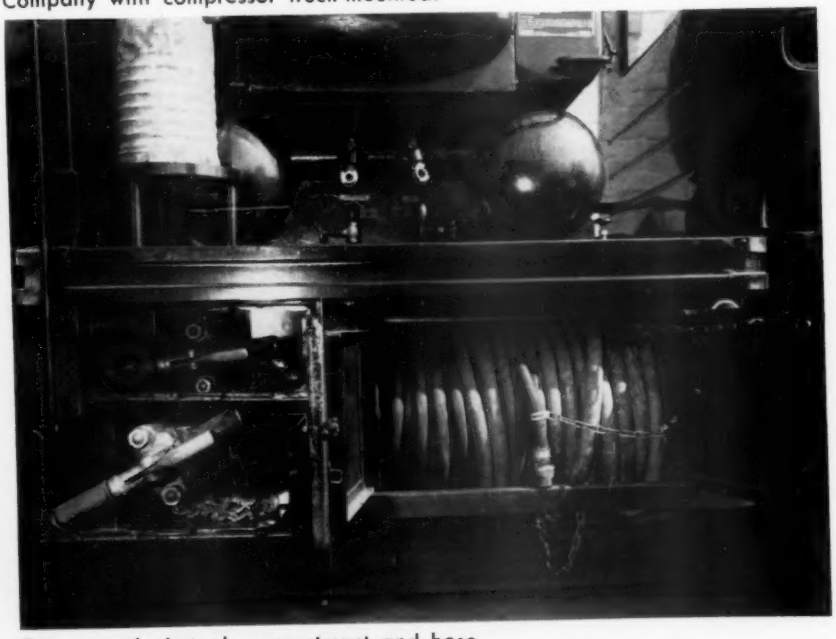


These bottles (right) are filled with gas at 2200 psi by the air compressor (below) to provide field service supply during a meter change.

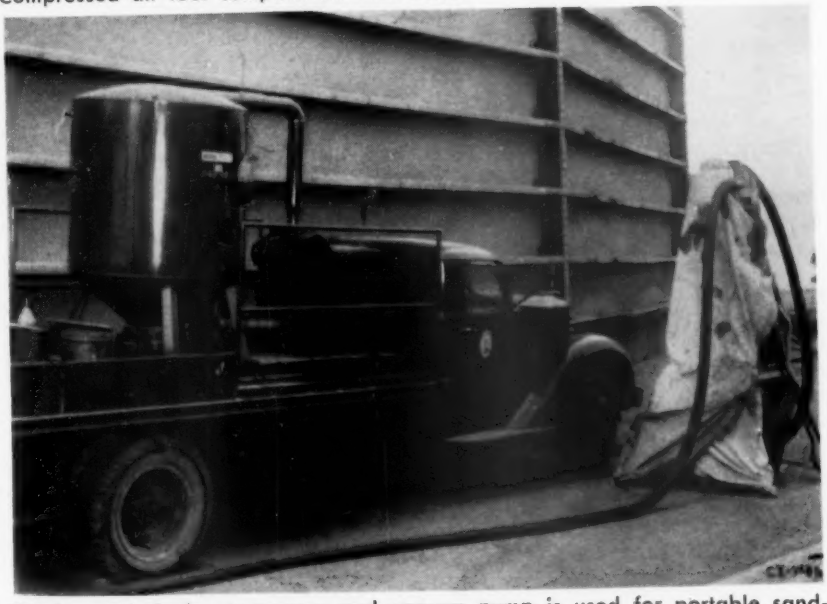


Gas-filled bottles are tied into the service line during a meter change.

Typical service truck of Southern California Gas Company with compressor truck-mounted.



Compressed air tool compartment and hose.



Truck-mounted air compressor and vacuum pump is used for portable sand-blasting rig. The vacuum works at a hooded nozzle to draw off sand from blasting. Hose line takes sand to receiver, at right.

carry, push, pull, tilt, raise and lower pipe or fixtures for handling the pipe in controlled sequence. From one movement to the other, triggers or cams are tripped or switches actuated by the movement of the pipe.

The yard turns out approximately 40,000 ft per day of wrapped pipe in sizes ranging from ¾-in. to 4-in. and quantities of larger sizes.

Big Pipe Benefits, Too

Wrapping 16-in. pipe does not follow the same methods as for the smaller diameter pipe, but the use of air jacks to lift pipe or equipment and other similar automatic processes to facilitate the operation are followed. Moving the large sized pipe for wrapping presents no serious or time-consuming problem. Long pipe laydowns in the yard, about waist-high, carry the pipe to its station by gravity. For practical reasons, the transfer is not accomplished by one, long gradual slope. Rather, at intervals, the heavy pipe trips triggers that actuate air cylinders to send out arms and raise the pipe to another level a foot or so higher than the last and on to the next air lift.

Drawing the 16-in. pipe during the wrapping process is a carriage moved by air motors. This provides the variable speed needed for close co-ordination with the wrapping process and then, the fast return when the carriage comes back for another section of pipe.

By doing its own pipe wrapping, Southern California Gas has an assured supply of pipe wrapped as is needed.

Many Pipe Yard Uses

There are several other uses for compressed air in the pipe yard.

An old railroad ram acquired at low cost is used for straightening 3-in. pipe. Smaller ¾-in. pipe is straightened by means of an air motor driving a chain turning a series of rollers. Hydrostatic testing is simplified by use of two air rams to lift and lower the pipe and an air motor provides the locomotion. In this case, even the 100 psi pressure is built up by compressed air by use of an old boiler injection pump. The investment was much lower than for a conventional pump for this purpose and the results are good.

The many uses for compressed air in the pipe yard are supplied by two air compressors of 375 cfm capacity each.

No Service Interruption During Meter Change

To provide better customer service and improve public relations, to say nothing of saving itself considerable inconvenience, Southern California Gas Company has found a way to prevent interruption of service while changing

a gas meter.

Natural gas is compressed in oxygen-acetylene type bottles at 2200 psi and these bottles are tied into the line while the changeover is being made. This gives a supply of 247 cu ft per bottle. The bottles are filled at one of the gas holder plants.

Among the benefits from this arrangement are the elimination of the need to make advance arrangements with the customer for a changeover so there will be someone in the home and the saving of time in shutting off all pilots, etc. before the work and turning on after. Also, small commercial customers frequently can be served this way without the expense of running a bypass.

Air Powered Service Tools

Other field operations requiring power are supplied, of course, by portable air compressors. Service trucks are equipped with the usual pneumatic tools such as paving breakers, clay spades, tampers, chipping guns, and wire brushes.

Air motors play an important part in the tool compartment. These are used for boring operations under pavement and in yards in order to avoid trench work in laying connections. This time-saver also is good public relations. The air motor turns a drill while water is fed at the drill to soften the earth. Usually, a 20-ft pipe section is used. If there is plenty of space, two or three sections may be used, or if space is restricted, smaller sections are used.

Another use for air motors is in tapping a line where there is no valve. On larger lines, especially, this would be a long and tedious job by manual methods, but the air motor quickly drives the shell cutter and because it is spark-free, may be clamped right on the line.

Custom Mounted Compressors

The gas distribution department has given careful study to the design and working arrangement for its vast fleet of trucks, all of which are custom made to a standard design. In most instances the air compressor is skid-mounted on the truck in order to obtain maneuverability in crowded traffic and close working space. Usually this outweighs the advantage of a trailer-type portable compressor, which a truck can haul to the point of work and then leave it for other duties. Lighter service trucks, however, do move the compressor by trailer.

The truck-mounted compressors may be easily replaced by garage night crews. The receiver is located under the truck to save space and consists of three separate containers.

The fleet is flexible enough to meet many varying conditions. Most of the portable compressors are of 150 cfm capacity with some larger ones of 210 and 310 cfm and smaller ones of 60 and 85 cfm. Because the centrifugal type compressors are lighter in weight, take less space, and have high output, the trend is to gradually replace the reciprocating compressors with the more recently available centrifugals.

Meter Shop Uses

In its meter shop, SoCal Gas makes extensive use of portable pneumatic tools, air vises, air cylinders for submerging meters for testing, and other applications commonly found in a gas meter shop. Here, as in other departments, compressed air is a vitally important aid in keeping service abreast of the incessant demand.

Gas Holder Maintenance

Maintenance on the company's huge gas holders have been improved by some interesting applications of compressed air. One of these is the replacement of the block and tackle used to raise and lower staging by using air motor-driven spider staging. One motor is used for an individual stage and two for a scaffold.

Air power in this application makes the work go faster and easier and because of spark-free motors, it is entirely safe. A built-in locking device serves to lock the cable in the event that the staging starts to drop at a rate faster than a predetermined "normal" velocity.

Compressed air and vacuum team up to help in another way on maintenance. On work such as sandblasting the crown or seams of a gas holder a hooded nozzle is used. The sandblast comes out in the center and the outer part of the nozzle vacuums the sand into a tube and down to a container. On flat surfaces where the nozzle can fit snugly, the arrangement works extremely well. This eliminates annoying clouds of dust.

The air compressor and vacuum pump, which is an air compressor in reverse, can be truck mounted and taken to any one of the eight gas holders or elsewhere.

Southern California Gas uses compressed air in many ways in addition to those mentioned. Nothing has been said, for instance, about the little air compressors that start the big gas compressors, which are the very heartbeat of the gas system. Some of the older gas compressors, incidentally, are simply large two-stage air compressors adapted for the purpose.

Compressors and compressed air are old and familiar parts of the gas industry. Southern California Gas Company, however, has not permitted familiarity to blind itself to ever increasing beneficial uses for this versatile power. ★ ★

Merchandising News Notes

Tuesday, December 11, 1956, marked a milestone in the history of the gas utility industry in the United States. On that date, somewhere in the nation's broad expanse, the 30-millionth gas customer was connected. Exact location of this "statistical milestone customer" isn't possible, but it was somewhere in the 45 states now served by natural gas.

"Tax on Cleanliness" is the way manufacturers of gas and electric water heaters describe the federal excise levy on their products. Members of Gas Appliance Manufacturers Association and National Electric Manufacturers Association who make water heaters have filed a brief with Congress for reclassification of their products. Of more than 38,000 plumbing and heating items, only water heaters are taxed.

Over the million-dollar mark for the second time in its merchandising history, Brooklyn Union Gas Company monthly appliance sales reached a peak $1,026,586 in October, 1956, just shy of the record $1,039,953 reached in September, 1950, when pre-buying caused by the Korean war pushed sales upward. Biggest activity for the company is conversion of house-heating equipment from oil to gas.

Natural gas — where it comes from, how it is transported, distributed, and the problems and accomplishments of the industry are being told to the public in a special display at the National Housing Center in Washington, D. C. Prepared by the Independent Natural Gas Association of America, the graphic illustration is coordinated with the Housing Center's display of gas appliances sponsored by the American Gas Association.

"Mrs. America" has returned from a six week goodwill tour of the Soviet Union and eight European countries, on which she was accompanied by her husband, Chris Maletis, right, and Bert Nevins, managing director of the "Mrs. America" homemaking contest. First contest winner in American history to be granted a visa by the Russian government, Mrs. Maletis exchanged homemaking tips with Russian housewives in Moscow.

AMERICAN Gas Journal Merchandising

NINETY-EIGHTH YEAR

News and Features Designed to Further Cooperation Among Utilities, Dealers, and Manufacturers

NUMBER 57 • JANUARY, 1957

In Southern California, Homebuyers Prefer to . . .

Live Modern—More Economically With *GAS!*

Burton Larson,
Manager Residential Sales
Southern Counties Gas Company of California

DRAWING power of all-gas kitchen equipment as an aid in selling new homes has become increasingly evident in several recent developments in Southern California's home-conscious, booming Orange County. The sales picture there indicates that, with homebuyers looking for all-round value, modern gas appliances are more than ever a potent factor.

Not only does the Orange County picture reveal recent shifts by some builders — who formerly built "all-electric" or largely electric tracts — to predominantly gas-equipped developments, but the pattern is also clear in the failure of some high-powered, nationally publicized all-electric home promotions in the area.

Most spectacular instance of sales resistance to the blandishments of strong promotional and advertising campaigns by electric concerns was the case of Linda Lyle Estates at Fullerton, in the heart of the county's homebuilding "belt."

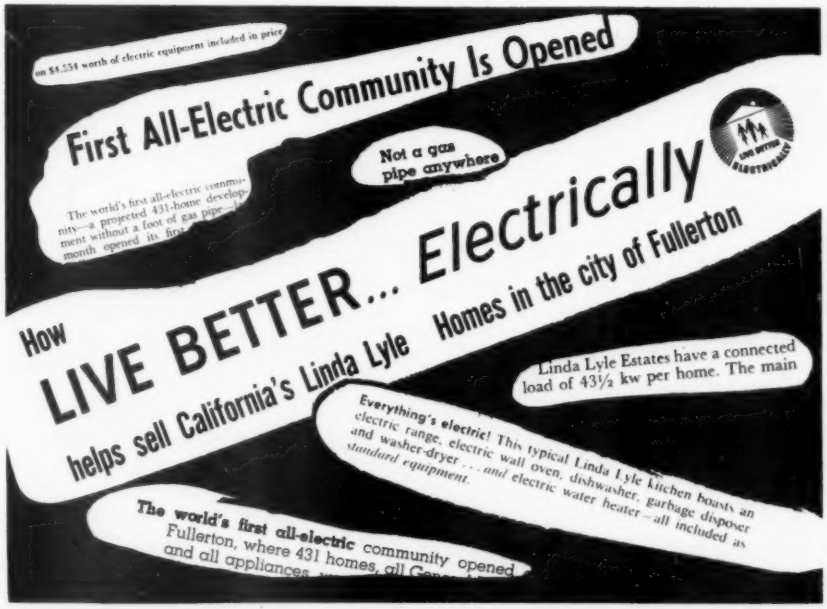
Shortly after the Linda Lyle development opened in June, 1955, an electrical trade magazine trumpeted:

> **"Not a gas pipe anywhere . . . The world's first all-electric community — a projected 431-home development without a foot of gas pipe . . ."**

Yet this fall, after almost 18 months and on the heels of a conservatively estimated $100,000-worth of promotion, only 31 homes are completed of the 431 promised in the promotional ballyhoo. Of these 31, nine are still unsold.

The homes, priced at $20,500 to $24,500 and, by all reports, imaginatively designed and well constructed, offer "a choice of floor plans and elevations, with fencing and landscaping."

The initial blast of promotional material on the Linda Lyle homes included four double-page ads in three Los Angeles metropolitan newspaper real estate sections, followed over a period of time by seven more one-page ads in two of the Los Angeles dailies; seven


First All-Electric Community Is Opened
Not a gas pipe anywhere
How
LIVE BETTER... Electrically
helps sell California's Linda Lyle Homes in the city of Fullerton
Linda Lyle Estates have a connected load of 43½ kw per home. The main
Everything's electric! This typical Linda Lyle kitchen boasts an electric range, electric wall oven, dishwasher, garbage disposer and washer-dryer . . . and electric water heater — all included as standard equipment.
The world's first all-electric community opened
Fullerton, where 431 homes, all

This Big Splash for the "all-electric" Linda Lyle Estates in Fullerton, California, was only part of the mammoth promotion given this home tract. Almost 18 months later, the tract still languished sales-wise.

GAS KITCHEN in the new Midwood-Signature development in Garden Grove, California, represents a shift by one of the largest Southern California — and national — home builders from electric to gas kitchens. The equipment here includes built-in gas range, gas refrigerator, and gas clothes dryer.

billboards sponsored by a major electric appliance manufacturer; the mailing of 50,000 engraved invitations sent throughout greater metropolitan Los Angeles; double-page ads in at least four building trade magazines; and radio and television commercials.

In all these media very little prominence was given the homes as such. The major emphasis was on the "all-electric kitchens" and the use of other electrical equipment, such as space heating and water heating.

At the end of this concentrated campaign of nearly 18 months, 19 of the 31 homes remained unsold.

On the first anniversary of the Linda Lyle opening, a second major sales effort was mounted. The "commercial" on a national half-hour television show sponsored by the same giant electric equipment manufacturer was devoted entirely to Linda Lyle Estates. Half-page advertisements were again run in all Los Angeles metropolitan papers and in 10 outlying newspapers. Two thousand 2 by 3-ft luminescent posters were tacked to power poles at major intersections within seven miles of the development; two new billboards again told the "all-electric story."

In spite of all this, the final record as of late fall stood: Nine of the 31 homes still unsold, and no mention of any more building.

One reason advanced for the apparent lack of desire on the part of the public to "Live Better Electrically" was this: Over a 10-year span, use of natural gas instead of electricity for heating and air conditioning, refrigeration, cooking, and water heating would save each homeowner an estimated $2160.

While sales sagged at all-electric tracts, construction in the entire area (from July, 1955, through August, 1956) was down somewhat but still managed to hit a healthy level of 25,300 new starts. Of 13,700 homes where gas meters were installed in the first half of 1956, there were 11,900 equipped for gas cooking, while only 1813 featured electric ranges.

An even more telling figure is embodied in the record of completed, unsold homes in Orange County. As of fall, 1956, out of 3400 homes completed for six months or longer and still unsold, 2259 — or more than two-thirds — were equipped with electric kitchens.

While Linda Lyle was languishing, other builders in Orange County were "taking the hint."

A significant example was Midwood-Signature Homes, headed by builders Max Levine and Jerry Snyder, which was recently tabbed as the nation's twelfth largest homebuilding concern by *House and Home* magazine.

Some recent Midwood tracts had featured electric equipment, and the Midwood-built, electric-equipped model Signature Home at the 1956 Los Angeles Home Show competed for public attention with the all-gas Vandruff Cinderella Home.

When Midwood recently announced inclusion of gas equipment in its new Signature Homes, Garden Grove development, the Southern California building industry watched with interest. The gratifying record to date: **63 homes sold in one month.** The projected new Midwood development envisions an eventual community of 400-500 homes.

Other builders have also recognized the greater sales appeal of gas equipment. Henry Cox, whose "Lifetime Homes" had been heavily electric, switched to gas equipment for his "Golden Key Homes." Cedric Roberts, another major builder in the Southern California area, changed from straight electric to optional gas or electric in his large Katella Park development. The same was true of Walter Mellott in his new Harbor Highlands development in coastal Orange County, and of Tietz Construction Company's new Buena Park tract.

In the nearby Pomona area, Ford Investment Company, whose electric-equipped Baxter Square tract had encountered slow going in sales, is switching to the Holiday Kitchens gas "package" in a new development.

Both in Pomona and Orange County, Weiss Construction Company, which builds the widely publicized "Trudy Richards" homes, is switching from electric kitchens to gas kitchens.

Southern Counties Gas Company feels that this pattern reflects credit on a "heads up" sales force and wide-awake promotion throughout Orange County, Pomona, and other active homebuilding areas.

It also points up the fact that, in a market where homebuyers are looking for every indication of quality, durability, cleanliness, and real long-term economy, gas kitchens greatly enhance the sales appeal of today's — and tomorrow's — finest homes. ★ ★ ★

Western Kentucky Gas Company officially has occupied its modern new general office building in Owensboro, Kentucky. The Owensboro Messenger and Inquirer, which recently issued a 22-page special section featuring the gas company, referred to the building as the "most modern" in Owensboro. One of the features, and a "first" in the state of Kentucky, is the conveniently located drive-in bill payment window that allows customers to pay their service bills without leaving their automobiles.

AGA Levels Sights On Gas Industry Targets

Six major information targets for 1957 have been approved by the AGA General public information planning committee which met in Pittsburgh recently.

The targets are: (1) Show the public service advantages of the investor-owned gas industry; (2) Demonstrate that gas is an expanding industry with a big future; (3) Develop a receptive climate for sales; (4) Help recruit new employees for the gas industry; (5) Win public support for the gas industry's financial and rate requirements, and (6) Correct misstatements and prevent harmful publicity about gas.

The PAR public information program will continue to supply local companies with public relations items such as institutional ads, booklets, and speech materials.

Thomas H. Evans, vice president, Equitable Gas Company, Pittsburgh, has been appointed chairman of the general public information planning committee for 1957. James F. Purcell manager of public relations, Northern Indiana Public Service Company, Hammond, will continue for a second year as chairman of the public information projects committee.

Three Awarded for Life Saving Actions

Three Northern Illinois Gas Company employees were honored recently for their quick thinking and prompt action that helped to save six lives. Recipients of The President's Award for the saving of human life were Ora Harman, LeRoy Marconi and Albert McCloud.

Harman, who works at the company's gas plant in Skokie, saved the life of a 20-month old boy when a neighbor's house was ripped by a propane gas explosion and fire. Harman carried the boy out through a torn-out side wall before the house was leveled by fire.

Marconi's (a credit department employee in the south suburban area) quick-thinking brought the fire department to a customer's home in Chicago Heights in time to save the lives of three small children trapped in the burning structure.

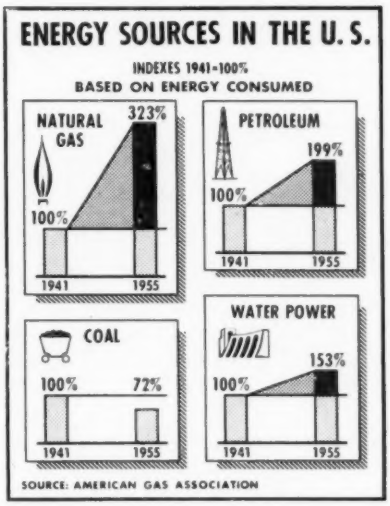
Prompt action by Scoutmaster Albert McCloud, operating foreman for the utility in the Joliet area, averted a near tragedy on a Boy Scout overnight camp-out when he rescued two youngsters from a flaming tent.

Five Northern Illinois Gas employees now have received this special award established in 1955 by the utility's board of directors to "recognize individual heroism, presence of mind, and prompt action of employees resulting in the saving of human life."

Marvin Chandler (left) president of Northern Illinois Gas Company, congratulates (left to right), Albert McCloud, LeRoy Marconi, and Ora Harman, 1956 employee recipients of awards for saving human life.

Corrosion Short Course Scheduled for June

The second annual Appalachian Underground Corrosion Short Course will be given at West Virginia University, Morgantown, June 4, 5, and 6. Frank Costanzo, corrosion engineer for the Manufacturers Light and Heat Company, is the general committee chairman for the Corrosion Short Course.



'Think Safety — Work Safely' Wins Slogan Contest

Even a low on-the-job accident rate can be lowered still more with a hard hitting safety program, Walter M. Jeffords, Jr., president of the Brooklyn Borough Gas Company, said, in announcing the winner of the company's 1956 safety slogan contest.

This year's winning slogan, submitted by Anthony E. De Lio, garage foreman, is "Think Safety — Work Safely." The new slogan will be used in addition to the present slogan, "Make Every Day a Safety Day" on company literature, signs, and the panels of all automotive equipment throughout the 10½ sq mile ocean-front area served by Brooklyn Borough.

In 1950, there were 110 accidents in every category in the company's plant and in the field, with 274 work days lost. In 1955, there were 26 accidents and only 40 work days lost. In 1950 there were 14 automobile accidents as compared to four in 1955.

Safety program activities included regular meetings of safety council groups with each accident occuring since the last meeting being fully reviewed with emphasis placed on preventing a similar accident; safety inspection of every department; showing of motion pictures and sound slide films on safety to employees in every department on company time; instruction classes in resusitation; a safety day award contest; a safe driving award contest; safety instruction for new employees; distribution of literature on safety obtained from the National Safety Council; installation of all types of safety equipment by the company as new devices are developed; and, the distribution of safety instruction cards to customers.

News Notes

More than 700 representatives of the oil, gas, and chemical industries attended the Sixteenth Annual Appalachian Gas Measurement Short Course sponsored by the West Virginia University. Ninety-three classes and three open forums were conducted with over 40 manufacturers displaying the latest developments in measurement and regulation. Highlighting the opening session were addresses by Captain C. V. Hawk, director of the U. S. Naval Boiler and Turbine Laboratory, and O. W. Van Petten, vice president of the Columbian Carbon Company.

Vancouver Island Gas Company Ltd. is erecting a $298,000 plant at Nanaimo, British Columbia, to produce butane gas for the Nanaimo market.

For the fourth time in its 45-year corporate history — and in less than three years — Southern Counties Gas Company has marked connection of a 100,000th customer in one of its eight operating divisions. The growth milestone was marked when more than 200 civic dignitaries from 13 incorporated communities served by the company's eastern division attended an open house at "The Lamplighter" model home in West Covina. Other operating units that now serve more than 100,000 customers are Santa Monica Bay, San Gabriel Valley, and Orange County divisions.

New York State Natural Gas Corporation has received the safety achievement award from the accident prevention committee of the American Gas Association. The award, in the form of a bronze plaque, was given for an outstanding record in employee accident prevention, with only 13 companies throughout the United States being eligible to receive it.

Total of 11 industrial natural gas contracts have been signed by the British Columbia Electric at Vancouver, calling for a maximum delivery of over 8,000,000 cu ft of natural gas daily in the lower mainland of British Columbia. A large portion of the gas contracted for is at the low cost "interruptible" rate for boiler fuel.

For the fourth year, Consoli-dated Natural Gas Company has received the bronze "Oscar of Industry" for the best annual report of the large gas companies in the sixteenth annual survey sponsored by "Financial World." A total of 5000 annual reports were entered in the international competition. Other winners in the large gas companies classification were: Peoples Gas Light & Coke Company, second, and National Fuel Gas Company, third.

Public Service Electric & Gas Company is trying a unique approach to its prospective engineering employees. The New Jersey utility is aggressively advertising the virtues of residence in New Jersey as a big advantage when working for the company. Help wanted copy, which is running in a number of college newspapers and magazines, stresses such attractions as seashore and mountain resorts, nearness to New York and Philadelphia, and cultural advantages. Heavy emphasis is also given to the prospect's bride-to-be, pointing out that "Mary" certainly would enjoy life in such pleasant surroundings.

Ground has been broken on the first unit of the Southern California Gas Company's 35-acre, multi-building operating headquarters in Rivera. The general operating headquarters will eventually include office buildings to accommodate accounting, engineering, job training, laboratories, and advertising display. This is in addition to a warehouse, gas meter repair shop, and garages for company automobiles. Both buildings will be one-story, concrete block construction. The warehouse mezzanine will be occupied by employees of the utility's purchasing and stores departments.

H&M PIPE CUTTING AND BEVELING MACHINES
Trademark Registered

Full Range of Sizes 1½" to 36"

★ ACCURATE: to the finest detail, any bevel angle, size or shape.

★ SIMPLE TO OPERATE: a few minutes instruction for any operator, for cuts of any shape or angle.

★ PROFITABLE: cuts labor and gas as much as 50%.

★ DURABLE: carefully machined of very best materials, for minimum wear.

★ SPEEDY: cut and bevel any pipe in minutes!

OTHER H & M TIME-SAVERS

★ SHAPE CUTTER — for all types of pipe fabrication.

★ "OUT-OF-ROUND" — for perfect cuts on "out-of-round" pipe.

★ "FLEXIBLE SHAFT" — perfect accuracy with 1 man cutting any size of pipe.

★ PIPE DOLLIES — for safety, speed, accuracy in pipe fabrication.

Precision-engineered for heavy duty work under most difficult shop and field conditions, H & M Pipe Cutting and Beveling Machines — regardless of size — are increasing in demand *wherever pipe is used.* The trademark of H & M is your constant assurance of dependability backed by service — *imperative to profit* on your jobs.

H&M PIPE BEVELING MACHINE COMPANY
TULSA, OKLAHOMA
Trademark Registered 311 E. Third St. Diamond 3-0241

Men At Work IN THE GAS UTILITY INDUSTRY

J. L. Gere

R. W. Hofsess

B. F. Wiand

● Three new directors of Cities Service Gas Company were elected recently. They are: **John L. Gere,** chief engineer; **Russell Hofsess,** manager, production and supply department; and **Burton F. Wiand,** manager, public and industrial relations. Two new directors were also named to the board of directors of Cities Service Gas Producing Company, a subsidiary. They are: **George V. Rowland,** industrial sales manager, and **A. W. Levan,** assistant secretary. **E. W. Lamparter,** superintendent, tax department, was named assistant treasurer of both companies.

● **S. P. Osborn** has been elected comptroller of Texas Eastern Transmission Corporation. Osborn, assistant comptroller since 1955, will fill the position made vacant when Orville S. Carpenter was elected president of the company recently.

S. P. Osborn

G. W. Anders

● **George W. Anders** has been appointed director of public relations for Texas Gas Transmission Corporation. Anders will be in charge of the company's public relations, financial relations, publications and advertising. Prior to joining Texas Gas, Anders was assistant manager of public relations for Texas Eastern Transmission Corporation.

● **William F. Smiley,** information director of the Ohio Fuel Gas Company, has been elected an assistant vice president of the company.

● **Charles L. Albert** has been appointed manager of the New Jersey Natural Gas Company's southern division. He succeeds **William R. Wallis,** who was fatally injured when struck by an automobile.

● **W. Alfred Pearce** has been appointed supervisor of the tabulating section of the New Jersey Natural Gas Company.

● **William C. Day** has been promoted to manager of the gas engineering department of the Columbia Gas System Service Corporation.

● **William A. Boyd** has been appointed assistant head of the general financial department of New York Natural Gas Corporation.

● **Bernard Kaapcke,** formerly with the Henry J. Kaiser Company as an editor, has been named to the staff of the AGA Public Information Bureau.

● **Clement Clendaniels, Jr.,** has been elected an assistant treasurer of The United Gas Improvement Company. He succeeds **Joseph B. Townsend,** who has retired after 43 years of service. Clendaniels has been in the treasury department of UGI since 1928 and is a past president of the Philadelphia Stock Transfer Association.

● The Columbia Gas System, Inc., has announced the following promotions: **Bernard H. Kinzer** has been promoted to assistant director of employee relations and safety of Columbia Gas System. He will become a member of the employee relations and safety committees. **Joseph J. Famularo** has been promoted to director of employee relations — New York. In this position he will become a member of the employee relations committee, and also will continue his present system responsibilities. **Mary Higgins** has been promoted to assistant director of employee relations — New York.

● **Milton D. Crane** has been appointed assistant director of research for Consolidated Natural Gas Company. He will head up research activities within The Peoples Natural Gas Company, a subsidiary of Consolidated. The assignment also involves being director of the Utility Survey Commission, of Pittsburgh; a fellow of the Mellon Institute in charge of the Peoples Gas Fellowship; and being superintendent of by-products sales of Hope Natural Gas Company, a Clarksburg, West Virginia, subsidiary of Consolidated.

● **Scott Hughes,** first vice president and director of Southern Union Gas Company, has received a diamond-set service award pin in recognition of 25 years of continuous service with Southern Union Gas.

Scott Hughes

W. J. Williams

● **William J. Williams, Jr.,** has been appointed traffic manager of The Peoples Natural Gas Company, New York State Natural Gas Corporation, and Hope Natural Gas Company.

● **Lonnie W. Wege,** former Missouri attorney, has been appointed assistant manager, industrial relations, of the Cities Services Gas Company in Oklahoma City, Oklahoma. Wege fills the vacancy left by the transfer last July of **R. E. Hill** to Petroleum Chemicals, Inc., at New Orleans, Louisiana.

L. W. Wege

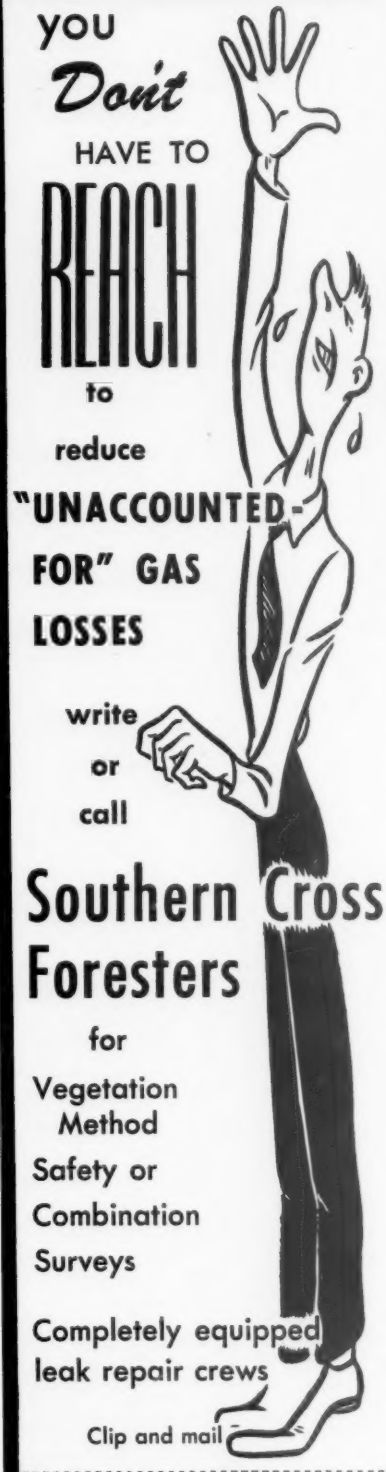
J. M. Lynn, Jr.

● **J. M. Lynn, Jr.,** assistant general sales and promotion manager for Lone Star Gas Company's general division of distribution since February 1, has been named general sales and promotion manager for the division. Lynn succeeds **Carl L. Trevitt,** retired.

A. J. Blair

W. F. McAnally

● **Dr. Albert J. Blair** has been appointed medical director of Consolidated Natural Gas Company. He will succeed **Dr. W. F. McAnally,** of Pittsburgh, who will remain with the firm as a consultant until his retirement October 1, 1957.



SOUTHERN CROSS FORESTERS
3677 Buford Highway
Atlanta, Georgia

Please send brochure regarding "Unaccounted-for" reduction.

Name_____

Company_____

Address_____

City_____

TRADE PERSONALS

● **George B. Earl** has been appointed sales manager of service body division of Morrison Steel Products, Inc., of Buffalo.

G. B. Earl

C. A. Ernst

● **Charles A. Ernst,** former assistant personnel manager of Sheffield Corporation, has joined Rockwell Manufacturing Company as headquarters personnel manager.

● **Charles E. Bulloch** has been named to the newly created position of director of product development for the A. O. Smith Corporation. He will report to marketing director **S. E. Wolkenheim.**

Bulloch will explore new product applications and markets, with particular emphasis on the field of glass fused to steel.

● **Henry E. Littlehales,** former newspaperman and public relations account executive, has been named press relations manager of the American Gas Association. He was formerly with the New York public relations firm of Rowe-Doherty Associates.

● **S. J. Grimm,** former Servel regional manager at Kansas City, has been promoted to a new position of manager of builder sales. His duties will include the development of gas refrigerator sales to builders.

● **Leonard Martikonis** has been appointed advertising and sales promotion manager of the Permaglas division, A. O. Smith Corporation.

● **Howard A. Reid** has been appointed executive assistant to the vice president in charge of sales for Walworth Company. He will coordinate advertising, market research, sales training, sales promotion, and public relations for Walworth.

● **Kenneth E. Lofgren,** formerly advertising and promotion manager of The Permaglas Division, A. O. Smith Corporation, has transferred to the parent company's public relations department in Milwaukee.

● **William Golding** has been appointed kitchen appliance promotion manager for Norge Division, Borg-Warner Corporation. He will be responsible for merchandising plans on refrigerators, home freezers, electric and gas free-standing ranges, electric built-in ranges, and gas water heaters.

● Royston Laboratories, manufacturers of Roskote pipe mastics and industrial coatings, has combined its sales offices serving the Texas, Louisiana, Arkansas, and Mississippi areas, into one office located in Houston, Texas. **W. R. Curley,** who is the new regional manager for this entire area, was formerly the Royston representative in Monroe, Louisiana.

● **Clifford V. Coons** was elected executive vice president and vice chairman of the executive committee of Rheem Manufacturing Company. He has been a vice president of Rheem since 1948 and a director since 1950.

● **M. S. Stevenson** has been named manager of the Dallas branch office of the Baker-Raulang Company, Cleveland manufacturer of gas and electric materials-handling trucks.

M. S. Stevenson

A. C. Hansen

● **A. C. (Arnie) Hansen** has been appointed national service director of Robertshaw-Fulton Controls Company. He will head the newly formed national service organization which will provide local field service throughout the U.S. to appliance manufacturers using Robertshaw-Fulton appliance controls.

● **Gordon V. Gorecki** has been appointed market development supervisor for 3M reinforced plastic pipe for Minnesota Mining & Manufacturing Company.

He will be responsible for market development, field testing installations, and assisting in the development of merchandising programs.

● **Sam K. Wilson** has been named advertising manager of the appliance division of the Geo. D. Roper Corporation. He will supervise all advertising of the division.

NEW LITERATURE

FOR THE GAS UTILITY INDUSTRY

Heater, Furnace and Incinerator Catalog. A new 28-page catalog on its complete line of vented and unvented radiant heaters, wall heaters, floor furnaces, incinerators, and "Fyrelog" heaters is now available from Martin Stamping & Stove Company. Illustrated with four-color illustrations of various models of appliances, the catalog also details specifications on each model.

Martin Stamping & Stove Company, Huntsville, Alabama.

Kitchen Heater Control. A bulletin describing Robertshaw-Fulton's new kitchen heater control — now is available. The control is a combination gas cock and thermostat specially designed for combination ranges in which a section of the range is used for room heating. The bulletin provides manufacturers with useful information concerning the operation of the control, cutaway diagrams, specifications and dimensions, and installation details.

Bulletin RT-783, Robertshaw-Fulton Controls Company, 110 East Otterman Street, Greensburg, Pennsylvania.

Power-Pak Bulletin. A new, four-page, illustrated bulletin, describing Power-Pak packaged automatic boilers for steam or hot water heating and hot water service, is now available from Orr & Sembower, Inc. Bulletin No. 1233 lists features and advantages, and tabulates dimensions, weights, and ratings for the various models in the line.

Orr & Sembower, Inc., Morgantown Road, Reading, Pennsylvania.

New Kitchen-Laundry Planning Guide. A new booklet on kitchen-laundry planning is currently being offered by *The American Home Magazine*. The most comprehensive booklet ever published by a major magazine, it contains complete cut-outs in the shapes of all types of kitchen and laundry appliances for use in planning for any space; instructions on plumbing, wiring, basic arrangements, special built-in equipment, and information on how to draw a kitchen or laundry plan; and a special section on financing with the latest FHA and government rulings.

The American Home Magazine, Promotion Department, 300 Park Avenue, New York 22, New York.

THOUSANDS OF MILES OF LONE STAR LINE PIPE

BEST BUY!

Lone Star electric weld line pipe has uniform wall thickness in every joint. Quick, accurate field-joint line-up and outstanding weldability . . . plus easy-to-bend characteristics . . . mean faster construction schedules. Plus value: year-after-year of trouble-free service.

Lone Star API line pipe, casing and tubing . . . made in Lone Star's ultra-modern plant . . . are quality-controlled from mining of the ore through the fine, finished products in the pipe mills. Lone Star is a completely integrated operation . . . dedicated to serving the oil and gas industries.

Neighbor, wherever you are, specify Lone Star and we both get a good deal!

Lone Star STEEL COMPANY

LSS

EXECUTIVE-SALES OFFICES
W. Mockingbird Lane at Roper • P. O. Box 12226 • Dallas, Texas

DISTRICT SALES OFFICES
Houston, Texas | Midland, Texas | San Antonio, Texas
Tulsa, Oklahoma | Wichita Falls, Texas | Shreveport, La.

NEWS NOTES

Four firms have been elected to membership in the gas water heater division of the Gas Appliance Manufacturers Association. They are: The Basford Manufacturing Company, San Francisco, California; W. L. Jackson Manufacturing Company, Chattanooga, Tennessee; National Steel Construction Company, Seattle, Washington, and Sands Manufacturing Company, Cleveland, Ohio.

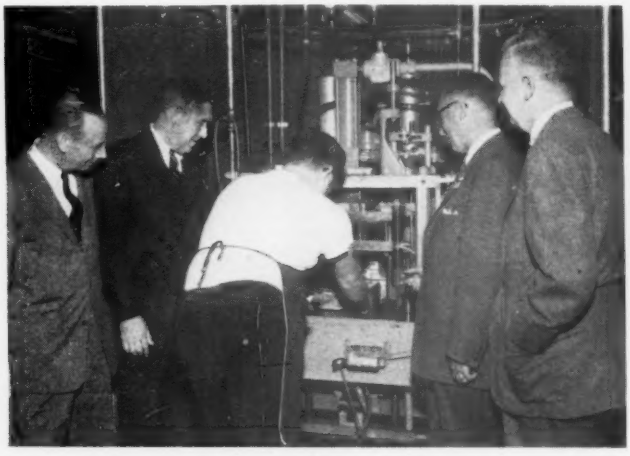
Hills-McCanna Company has appointed R. S. Stover Company, Marshalltown, Iowa, as exclusive sales agent for its products in Iowa, eastern Nebraska, and northwestern Illinois.

Bechtel Corporation, international engineering and construction organization, has opened a new branch office in Houston, Texas. W. E. Arthur, a vice president of Bechtel International Corporation, is the company's Gulf Coast representative and will be in permanent residence in Houston.

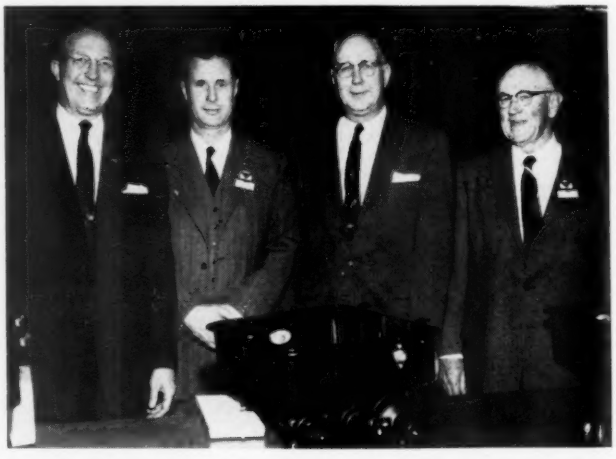
Minneapolis-Honeywell Regulator Company has purchased Davies Laboratories, Inc., of Beltsville, Maryland, manufacturer of specialized high-speed data recording systems. The Davies electronic systems use magnetic tape and are designed for high-speed acquisition, reproduction, and analysis of engineering and scientific data.

Completion of the second 40,000 sq ft section of its plant in Pasadena's Hastings Ranch Area has been announced by the ElectroData Division of Burroughs Corporation. Cost of the two-story structure, which will provide expanded facilities for engineering, manufacturing, and marketing personnel, is set at approximately $500,000.

Distribution of residential and commercial Ruud gas water heaters in Nebraska has been assigned to Mid America Appliance Corporation of Omaha. Reid A. Cameron, who has been the Ruud factory sales representative in Nebraska, has become general manager of the Mid America firm.



Operator demonstrates die casting operation for new welded steelcase meter at opening of American Meter's Fullerton plant. Left to right are Alan R. Bailey, senior vice president, Southern Counties Gas Company; C. Benson Dushane, Jr., vice president — sales, American Meter Company; George W. Stevenson, manager — West Coast operations; and W. R. Davis, executive vice president, Southern California Gas Company.



Fred D. Bradley, Southern Union Gas Company; William G. Hamilton, Jr., president, American Meter Company; George Eason, Delhi Taylor Oil Company; and Harold W. Wahl, southern division manager, Westcott & Greis, division of American Meter, are shown, left to right, examining assembly of a mercury orifice meter at the dedication of American Meter Company's new Garland plant.

American Meter Dedicates Two New Plants

Two new plants—in Fullerton, California, and Garland, Texas — were dedicated in December by American Meter Company. Both plants have been built as the initial phases of an American Meter expansion program to be centered in the leading gas and oil producing areas of the nation. The two plants will make or assemble a complete line of measuring and control equipment for the gas, oil, and chemical industries. They are two of six new plants built since 1951, and gives the firm a total of 10 plants in the U. S. and Canada.

Both of the two new plants have complete repair and service departments for all company products, and will have expanded warehouse facilities to enable immediate delivery of most orders.

At Fullerton, emphasis will be on production of the firm's recently developed W-175 Welded Steelcase Meter, which was specially designed for West Coast usage where minimum d.d.d. applications exist. The new meter, according to the company, is a "new concept of standardized meter design for economy and utility company savings." It features maximum service with reduced maintenance and repair costs.

At Garland, emphasis in the first unit of a long range expansion program will be centered on manufacture and assembly of orifice meters and a wide range of control equipment.

Both plants are single story and have dock-height floors for easy loading of trucks and freight cars. The Fullerton plant has 60,000 sq ft of floor space, and the Garland plant has 20,000 sq ft. Approximately 200 people will be employed at Fullerton and 50 persons will comprise the production group at Garland.

Attending the dedications at the two plants were gas and oil industry leaders and members of the press, who were shown the new facilities on guided plant tours, with luncheons as featured parts of the programs.

Headquartering at Garland will be Harold W. Wahl, manager of the southern division of Westcott & Greis, Inc., division of American Meter; and James W. Burg, Garland factory manager. At Fullerton, George W. Stevenson is manager of American Meter's West Coast operations and Carl M. Brehm is factory superintendent.

Fisher Governor Company Holds Fall Gas Regulator Conference. Pictured above are members of a group of 42 gas utility and transmission company representatives and 13 Fisher field personnel who attended the firm's fall gas regulator conference at Marshalltown, Iowa. The group spent three days in factory tours, demonstrations of manufacturing procedures and equipment maintenance, and classroom instruction conducted by Fisher engineering and sales personnel. Companies represented at the meeting included Manufacturers Light & Heat Company, Iowa Power & Light Company, Corning Natural Gas Company, Long Island Lighting Company, Public Service Electric & Gas Company, Niagara Mohawk Power Company, Connecticut Power Company, Rio Grande Valley Gas Company, Lone Star Gas Company, United Gas Company, Mountain Fuel Supply Company, Southeastern Michigan Gas Company, Michigan Gas & Electric Company, Michigan Consolidated Gas Company, Louisville Gas & Electric Company, Oklahoma Natural Gas Company, Pioneer Natural Gas Company, Southern California Gas Company, Blackstone Valley Gas & Electric Company, Laclede Gas Company, Missouri Utilities Company, Union Electric Company, Central Illinois Light Company, Illinois Power Company, Houston Natural Gas Company, Tennessee Gas Transmission Company, and Transcontinental Gas Pipe Line Corporation.

Erwin, Wasey & Company, Chicago, has been appointed advertising agency for Cribben & Sexton Company, who merchandise Universal brand gas ranges, built-in ranges and ovens, space heaters, gas dryers, and incinerators, and James-Universal automatic dishwashers.

Two new distributors have been appointed by Norge to handle its line of gas home appliances. Nelson & Small, Inc., Portland, Maine, will serve all of Maine's 16 counties and several counties in northeastern New Hampshire. Graybar Electric Company, Inc., Los Angeles, will carry on all Norge wholesale operations with dealers in eight counties of Southern California.

Roots-Connersville Blower Division of Dresser Industries, Inc., has appointed G. M. Wallace & Company of Denver, Colorado, as field application engineers for all Roots-Connersville products in Colorado, Wyoming, Montana, Utah, New Mexico, eastern Nevada, southern Idaho, and western Texas.

White-Rodgers Company, St. Louis, has announced the appointment of Howard A. Teasley to a newly created sales department position of national sales application engineer. The job was established to give original equipment manufacturers additional technical services with reference to AGA testing requirements.

Shareholders of Dresser Industries, Inc., have approved an increase in the company's authorized common shares from 4,400,000 to 10,000,000. The board of directors also authorized distribution of an additional common share for each share presently outstanding, thus effecting a two for one split of company's stock. Record date for dividend payment and distribution of the additional share was as of close of business December 3, 1956.

General Controls has announced new and larger facilities in the Seattle District office to service Pacific Northwest customers with its line of residential, industrial, and aircraft controls.

Construction has begun on the new 35,000 sq ft valve parts plant for Valve Products, Inc., subsidiary of Rockwell Manufacturing Company. Being built on a 20-acre site northwest of the Starke County (Indiana) Airport, the plant is expected to be completed in the first half of 1957.

Quaker Manufacturing Company division of the Florence Stove Company has transferred its general sales offices and personnel from the Merchandise Mart in Chicago to the company's manufacturing plant at Lewisburg, Tennessee.

Effective January, Fisher Governor Company has appointed Clarence B. Petty & Company as sales representative for Boston and the New England area. Other sales engineers that will assist Clarence Petty are Walter Taylor and Steve Lord.

Lynn Dollar, who operates the IBM sorting machine on the "$64,000 Question" TV show, hands a "$64,000" inquiry from one of 13 industry categories of customers to Edward L. Fortin, vice president and treasurer of Selas Corporation of America, during a recent visit to the company's plant at Dresher, Pennsylvania.

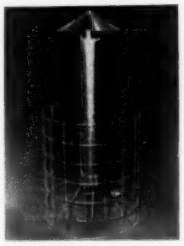
NEW EQUIPMENT

FOR THE GAS UTILITY INDUSTRY

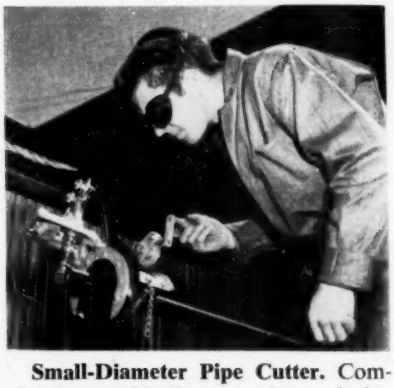
Expanded Heating and Ventilating Line. An improved and expanded line of heating and ventilating products for large area buildings, schools, auditoriums, and gymnasiums has been announced by Carrier Corporation. The new line will offer 72 capacities and coil arrangements in six different model sizes. Output of the full line ranges from 47,000 to nearly 2,000,000 Btu and from 1500 to 32,000 cu ft per minute. Another feature is a new "forward curved" fan which results in quiet, efficient performance at relatively low speeds. The units are designed to permit a wide choice of installations including either wall or ceiling suspension or floor mounting; they can be used with steam or hot water and work equally well with or without ducts. Air temperature from the units can be controlled by modulating steam through the distributing tube coils or by use of face and bypass dampers.

Carrier Corporation, Syracuse 1, New York.

High Ceiling Heating. A gas-fired salamander for heating high-ceiling industrial plants has been introduced by Summit Products Company. Advantages of the Radi-Heator are low cost, negligible maintenance, and the fact that it can provide heat in localized areas for numerous industries — or in plants that do not have central heating systems — at a cost of approximately one-half of conventional plant heating arrangements. Designed for use on either natural gas, manufactured gas, or LPG, the Radi-Heator consists of an off-on valve, a circular gas burner, heat deflector, and legs.



Summit Products Company, Uniontown, Pennsylvania.



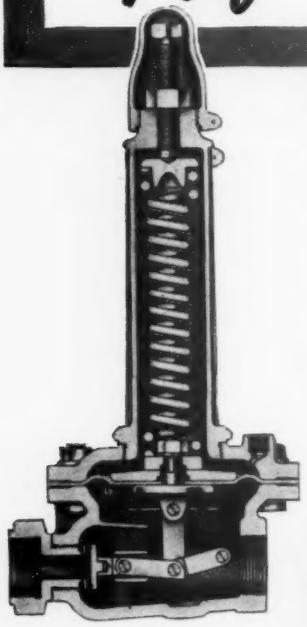
Small-Diameter Pipe Cutter. Completely portable flame cutting and pipe beveling machine for small-diameter pipe (1½ to 4 in.) has been announced by the H & M Pipe Beveling Machine Company of Tulsa, Oklahoma. Employing the same split-gear horseshoe principle of the company's larger units (up to 36 in.), the new, smaller model allows its operator to place the machine on continuous pieces of pipe. A quick-operating, specially designed boomer strap speeds up the process of changing the machine from one piece of pipe to another. Completely portable (weight: 7½ lbs.), Model "O" assures perfect, square bevels under all conditions and can be operated easily and efficiently by unskilled operators.

H & M Pipe Beveling Machine Company, Tulsa, Oklahoma.

IN THE HIGH PRESSURE FIELD

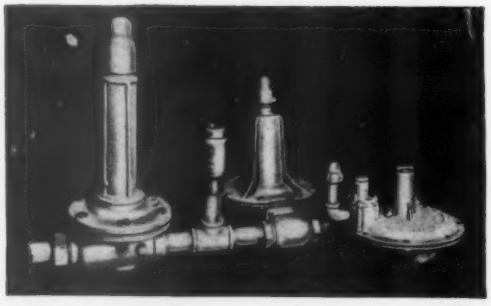
THERE IS SAFETY

IN *Reynolds* ...



Accurate, Safe Control

of tremendous pressures is an ever present problem in the gas field. Reynolds field Regulator illustrated at left is one of the many high pressure regulators built by Reynolds. It is thoroughly tested and proved in service. It handles up to 1,000 pounds safely reducing same to pounds. For more than fifty-five years Reynolds has designed and built gas regulators. Safety, accurate performance, years of service—these are some of the built-in factors responsible for Reynolds enviable position in the Gas Control Field.



Reynolds Gas Regulator Co.

ANDERSON, INDIANA, U. S. A.

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leak detector

detects and locates leaks on any pressure piping system in a matter of minutes!

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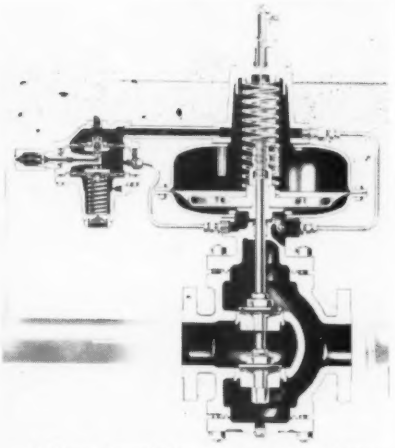
Here's the newest time-saver in the industry! The compact, portable Dragnet Leak Detector will detect even the tiniest leak on any pressure piping system for gas, steam, water or refrigeration. Unique "bubble action" principle much faster than by using pressure gauge or manometer.

SEND FOR BULLETIN 545

UNIVERSAL
CONTROLS CORPORATION
P. O. Box 13122
Walnut Hill Sta. — Dallas, Texas



Ultra-Sensitive Gas Regulator. Fisher Governor Company now has in production a new and improved design ultra-sensitive gas regulator, Type 298T. These units find wide use as intermediate or low pressure district regulators on gas distribution systems and as industrial regulators where inlet pressure does not exceed 250 psi. Diaphragm casing for the new Type 298T is made of deep drawn steel and has a large capacity, to promote stability and sensitivity of control. A glass-enclosed travel indicator is available which shows the position of the inner valve at all times. Stem connection utilizes a tapered lock nut into which the stem is screwed and clamped to resist shaking and vibration. Maximum inlet pressure is 250 psi. Controlled pressure range is from 5-in. water column to 65 psi.

Bulletin P-298-c, Fisher Governor Company, Marshalltown, Iowa.

New Inshot Gas Conversion Burner. Liberty Combustion Corporation's new "inshot" or "gun" type burner will convert 90 per cent of the oil-fired furnaces and boilers on the market to efficient gas-fired units with no alterations. Mounting Plate fits over any oil burner mounting lug. The burner is available in both a long and short model, with self generating or electric control systems; is AGA approved to 225,000 Btu per input.

Liberty Combustion Corporation, P. O. Box 300, Syracuse, New York.

Giant Portable Pipe Bender. Tal Bending Equipment, Inc., has announced its Tal One-Shot Giant Portable Bender that will bend 8-in. pipe, and large sizes to any degree up to 90 in a single setting, with only three minutes actual bending time. A 2-hp motor pump is used in the field to bend 8-in. pipe 90 deg. The bender can also be used with a ½-hp motor or gasoline motor.

Tal Bending Equipment, Inc., 417 North Water St., Milwaukee 2, Wis.

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Since 1941, this quality coal tar coating in handy tape form has demonstrated its ability to withstand corrosion year after year, above and below ground, on pipe, pipe joints, couplings and other vulnerable surfaces.

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PIPE STOPPERS OF ALL KINDS

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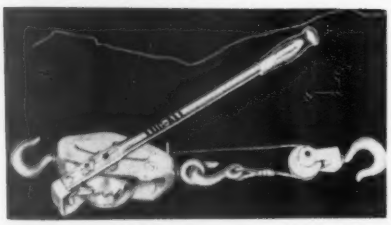

"Long Reach" Lug-All Winch-Hoists. Lightweight 1½ ton capacity unit with a standard lift of 30 ft, which makes it ideally suited for long pulls and lifts, and eliminating the need for any staging has been developed by The Lug-All Company. Model 3000-30 weighs 13¾ lb and includes a highly flexible aircraft cable that permits lifting, pulling or lowering a 1½ ton load a distance of 15 ft or a ¾ ton load a distance of 30 ft (using cable in a single line).

The Lug-All Company, Haverford, Pennsylvania.

New Pre-Fab Chimneys. Winnen Incinerator Company has announced a new line of insulated pre-fab chimneys for use with furnaces, boilers, ovens, and incinerators. These cost considerably less than brick or steel chimneys and are faster and easier to install. They may be free standing or supported by the building. Available in 18 or 10-in. ID, special sizes are supplied on order. A cast refractory lining 2-in. thick withstands continuous flue temperatures in excess of 1800 F.

Winnen Incinerator Company, Bedford, Ohio.

Automatic Self Contained "Sentry-Lite." A new "Sentry-Lite" has been designed by Hobby & Brown Electronic Corporation to provide instant automatic emergency light over large areas if power is interrupted for any reason.

Hobby & Brown Electronic Corporation, 237 Sunrise Highway, Rockville Centre, New York.

Index to ADVERTISERS

American Liquid Gas Company	37
American Meter Company	Front Cover
American Telephone & Telegraph	Inside Front Cover
Aqua Survey Corp.	52
Athen Stove Works, Inc.	Inside Back Cover
Barton Instruments, Inc.	—
Blaw-Knox Company	—
Bryant Heater Division, Carrier Corporation	—
Chaplin-Fulton Manufacturing Company	5
Cleveland Heater Co., The	—
Cleveland Trencher Company, The	2
Connelly, Inc.	—
Cruse-Kemper	—
Dearborn Stove Company	—
Dollinger Corporation	—
Drake & Townsend, Inc.	37
Dresser Industries, Inc. Dresser Manufacturing Division	
Electro Rust-Proofing Corp.	—
Fisher Governor Company	—
Gas Equipment Manufacturers Committee	—
Gas Purifying Materials Company	—
H & M Pipe Beveling Machine Company	44
Hays Manufacturing Company	—
Heath Survey Consultants	—
Hills-McCanna Company	—
Holan, J. H., Corporation	—
Hydrauger Corporation, Ltd.	—
Koppers Company, Inc.	—
Lone Star Steel Company	47
Mine Safety Appliances	—
Mueller Co.	9-12
Norton-McMurray Mfg. Co.	—
Ohio Injector Company	—
Oronite Chemical Company	—
Pipe Line Service Corporation	—
Reliance Regulator Division	—
Remington Rand	6
Reynolds Gas Regulator Company	50
Robertshaw-Fulton Controls Company	28-29
Rockwell Manufacturing Co.	—
Ruud Manufacturing Company	—
Safety Gas Main Stopper Co., Inc.	52
Sangamo Electric Company	—
Sheehan Pipeline Constructors	—
Sherman Products, Inc.	7
Skelly Oil Company	51
Skinner, M. B., Company	1
Southern Cross Foresters	46
Sprague Meter Company	Back Cover
Standard Pipeprotection, Inc.	—
Superior Meter Company	—
Tapecoat Company, The	51
Thomas, H. Emerson, & Associates	37
Universal Controls Corporation	51
Vulcan Rubber Products, Inc.	—
William Wallace Company	—
Wood, John, Company	—

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you can SELL

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Equipped with the famous HARPER burners. New THERMAL EYE automatic top burner available on all models.

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Center simmer burners . . . Oven Window and Light . . . Built-in Clock . . . Built-in Timer . . . Built-in Lamp . . . Matchless, Automatic Lighting of Oven and Broiler.

MODEL NO. 96-AEF-21

Featuring an Extra-Large Oven!

SPECIFICATIONS

Oven	24" x 19" x 16"
Broiler Drawer	22¼" x 18¼" x 5¾"
Cook Top	30" x 22"
Floor Space	30" x 26½"
Cook Top Height	36"
Overall Height:	
Deluxe Backguard	46⅛"
Approximate Shipping Weight	230 lbs.

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